SPE NEWS

NEWS

Issued Monthly to all Members of the Society of Plastics Engineers

Vol. 2 No. 6 June, 1946

A Message

FROM OUR PRESIDENT

IT IS a pleasure for me to dedicate this, the inaugural of the greater SPE News to our more than 1,300 members whose enthusiastic support of the original SPE News-Bulletin has resulted in the far improved magazine you see today. It is *your* magazine, fellow members, and its voice will be *your* voice . . . representing the activities and developments of each Section, each Professional Activity Group, and each individual. It will, we hope, represent the members of SPE throughout the plastics industry, as being leaders in their field. I extend my personal appreciation to the advertisers represented in this and forthcoming issues for their generous support. I urge the members to put this directory issue to the test of usage and derive the benefits thereby. It is my prediction that the forward step our Society has evidenced with this June 1946 issue, is the beginning of many other innovations to be revealed by SPE from time to time, in the interest of our common understanding and welfare.

Society of Plastics Engineers, Inc.

G. W. Clark

National President

SPE NEWS

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JESSE DAY, *Editor*
CASE SCHOOL OF APPLIED SCIENCE
CLEVELAND 6, OHIO

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MANHATTAN SECTION IS NUMBER 14

At a luncheon meeting on May 27th at Hotel Commodore, New York, the final organizing of Manhattan Section was concluded under the direction of J. H. DuBois, Eastern Chairman of the National Membership Committee.

A number of SPE members in New York, who have been affiliated with Newark Section, had indicated a desire for their own geographical Section, and at the meeting on May 27, the Manhattan Section was formally organized.

The following Section Directors were selected:
George Bohrer, Ideal Plastics Co.
Robert Brinkema, Egmont Arens
Charles Carlson, Marks Products
C. J. Cowan, C. J. Cowan Co.
L. Francisco, Formica Insulation Co.
Samuel Gurley, Durez Plastics, Inc.
David Murray, Boonton Molding Co.
Arthur Nufer, Bakelite Corp.
W. C. Peterson, Ideal Plastics Co.

Manhattan is the first new geographical Section formed this year, and is the forerunner of several others which are being organized in the East.

"News" to Feature Articles and Wider News Range

This issue of the News represents a major step forward for the SPE. The inclusion of paid advertising, plus a new format and cover, with larger type makes the News brighter and more readable. Since this issue is the last before Summer suspension of publication, it is only a sample of the new publication to come. The change is not just a physical one, but one of policy, and some of the new things you can look for when publication is resumed this Fall are: short articles written by experts on phases of plastics engineering of general interest, improved news coverage of Section news and activities, a more complete calendar of events, and, we hope, more personal items. Remember that the News is the publication of the whole Society, if there is any improvement you can suggest, or news of people or Sections, then drop a line to the Editor and help make the News serve the Society in the fullest possible way.

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1947 ANNUAL PLASTICS EXHIBIT

Preliminary arrangements have been concluded to hold the Third Annual SPE Plastics Exhibit at the Coliseum, Chicago, during the week of January 27, 1947, according to Mr. J. O. Reinecke, Acting General Chairman of the Exhibit Committee, who also states that several hundred rooms in the loop hotels have been reserved for the week.

The decision to hold the Third Annual Exhibit in Chicago was made by the Exhibitors in the Detroit Exhibit. About two months ago a questionnaire was submitted to these companies who exhibited in Detroit last January, and an overwhelming majority of them voted for Chicago. In response to this expression from the Exhibitors, the Council approved Chicago at its last meeting. At the same time Mr. Reinecke was appointed Acting General Chairman. Mr. Reinecke is also National Treasurer and President of Chicago Section, SPE.

It is tentatively planned to hold technical meetings each morning during the week. The Exhibit will be open to members and registered executives and engineers from one to four o'clock each day, and the general public admitted from four o'clock until closing, according to Mr. Reinecke.

ON THE APPOINTMENT OF AN EXECUTIVE SECRETARY

As many of our members know, Mr. W. B. Hoey has been appointed by the Council as Executive Secretary, in charge of the National Office of the Society.

The Constitution provides in Article X, Section 1, C-42, that "The Council shall establish such committees as may be provided in the By-Laws, and may be deemed necessary for the proper conduct of the Society's affairs."

The By-Laws state in B-69 that "The President may, with the approval of the Council, appoint such other committees for any special purposes as may be found desirable from time to time, naming the chairman of each such committee," and in B-70 that "The President and Secretary of the Society shall be ex-officio members of all committees."

It became apparent at the beginning of the year that the growth of the Society and the increased burden placed on officers necessitated delegating as much routine and promotional work as possible to a paid full time secretarial staff or committee.

On January 9th the Council approved the appointment of a full time paid executive secretary, and approved the President's appointment of Mr. W. B. Hoey as Acting Executive Secretary to prepare a

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THERMOSETTING EXTRUSION

By GUSTAVE HOLMGREN

Gustave Holmgren, Plastics Consultant, 126 Water St., Sheboygan Falls, Wisconsin, has had wide experience in the plastics field. He attended Antioch College, and received a Law degree from New Jersey Law School. Nine years with Bakelite, five years with Monsanto, a plastics consultant for the U. S. Navy for over two years during the war, and two years of research and development on the extrusion of thermosetting materials make Mr. Holmgren eminently qualified on his subject. Mr. Holmgren is a member of the SPE.

Thermosetting extrusion is much less like transfer molding than transfer molding is like compression molding. This statement may help give some idea of its place in the plastics picture. In transfer molding or other thermosetting molding, the final cure is effected only after complete flow or movement of the material has taken place. In thermosetting extrusion the flow or movement of material and cure are concurrent. This is the basic difference. In fact, a stoppage in material movement for any appreciable time will generally result in a freezing up of the extruder.

England has been extruding phenolic materials for several years, employing a plunger type machine. Apparently they have been confined to the use of wood flour and cotton flock filled materials. Results, according to all reports, were fair and some production resulted. Samples examined by the author show pulsation markings of the plunger movement and possessed only a mediocre finish.

Although others in this country are probably experimenting with this method of fabrication, the processes most familiar to the author are the Chrysler or Cousino, and the Schwartz processes. The former has as its source of power and delivery a screw with intermeshing baffle gears, while the Schwartz method employs a reciprocating piston. Each method has its advantages. The piston type lends itself more readily to small parts than does the screw type which, however, appears to provide a more constant pressure. The piston type provides greater facility and lower cost in interchangeability. A change in the size and pitch of the screw requires an entire new screw, screw-box and baffle gears, whereas a change in size on the piston machines needs only a piston and cylinder. The screw type seems to lend itself more readily to larger parts than does the piston type. Proponents of both machines claim tremendous extruding pressure—this discussion has never resolved itself into indisputable facts, and furthermore should not be too important.

Neither of the foregoing processes has been reduced to commercial production as yet, although with continued sound research both could be.

Our best results were obtained using Bakelite BM 1914 natural, a phenolic semi-impact macerated paper filled material. Why this particular material worked so successfully, particularly for tubing, is not definitely known, but its success is probably attributable to a combination of flow characteristics and bulk factor. Various plasticity tests including the Peakes-Rossi, flow cup and others, have not revealed, plasticity-wise, why this material has advantages over the other materials. Material manufacturers have not yet been able to supply a satisfactory answer.

Bulk factor was mentioned because pourability and processing of the material in the extruder are influenced by the bulk. High impact materials have been extremely difficult to extrude because of the high bulk involved preventing uniform feeding and hence non-uniform pressure in the extrusion process, which leads to erratic results. General purpose wood filled materials with a lower bulk give denser packing requiring higher pressures than with BM 1914, although there are indications that temperature adjustments can influence this factor.

It is very likely that the bulk of BM 1914 fortunately approaches the best condition for material as we used it.

Pelletizing of all materials would most likely minimize, if not eliminate this problem. Perhaps in the near future the material manufacturers will attain this objective.

It has been well established that extremely close control on materials is one of the most essential requirements. A difference of only two seconds less in closing time of a flow cup caused an increase in extruding pressure of about 100%. Under such conditions there are unnecessary, extreme strains imposed on the machine and die, with imminent danger of breakage or misalignment, and with the ever present possibility of a freeze-up. This slight difference in plasticity would not be ordinarily detectable in other molding processes. Realizing this extreme sensitivity and the fact that we were using standard, not custom-made materials, it is quite likely that other variables, not readily apparent, were present.

The oft sought "ideal" material—for many jobs at least—would seem to be in even greater need in extrusion. A material with a long soft-flow period that will form under extremely low pressure and kick over very quickly would supply sorely needed characteristics that would greatly facilitate and improve themosetting extrusion.

During one experimental run, we sheared off practically simultaneously four one inch tool-steel

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bolts that secured the die to the machine. A more fluid material would certainly impose less strain on the system and would permit greater latitude in design as well as reduced die cost.

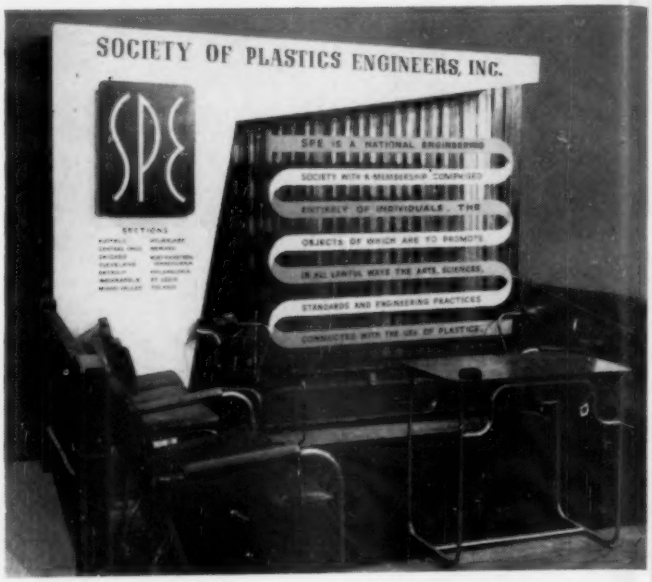
The use of added lubricant to molding material facilitated thermosetting extrusion by reducing surface friction and promoting better flow.

Urea and melamine molding materials have been tried in the thermosetting extrusion process with only very fair results. Indications are clear that improvements in the flow characteristics of these materials are prerequisites to their successful extrusion.

With the present plastic materials, hardened steel dies are essential to prevent any metal distortion. This was clearly established during experiments using a soft female die on a set-up for extruding three inch O.D. tubing with one-quarter inch wall. Just subsequent to the attainment of good tubing a differential flow condition would take place with the outer surface being sheared away from the internal flow of material. Measurement of the female die disclosed that a bulging or distortion had taken place in one section to the extent of 0.015"-0.020" in diameter. Regrinding and repeating the experiment several times produced a positive check. The same die was then bored out and a hardened steel sleeve with a wall section in excess of one half inch was securely inserted. Subsequent runs under identical conditions as with the soft wall revealed no distortion.

Highly polished dies produce the best results. Honing and polishing produced excellent finishes, mirror-like in appearance. Naturally, the dies cannot be too accurate and held too closely to dimensions. Chrome plating is a most desirable finish to produce high lustre products and to minimize frictional wear.

The field of die design for thermosetting extrusion is new, different, and presents many unexplored phases. Whereas the length of thermoplastic extrusion dies are measured in terms of inches, the thermosetting extrusion dies are measured in terms of feet. The greater length is necessitated by the plasticizing, forming and curing that must take place within the die length. All the dies we used were straight in line, in which the screw and die had a common center line. Although this is the best set-up for rods or solid sections, it does not seem to be so for tubing or hollow forms. The latter requires a male as well as a female die. This means that the male must not only be supported over a small area but must line up almost perfectly with the female die and stay that way. The males must be supported over a small area because of the orifices which must not be too long, otherwise the material is separated over too long a period thus making difficult the welding together beyond. In order to simplify this set-up, the author believes that what he calls a tangential die set-up would be a step forward. Although we never tried this type of die, there are good reasons to believe it would succeed. Furthermore, it would have the advantages of lower-cost, greater rigidity, greater ease of assembly and disassembly, better heat control, and greater dimensional accuracy in the extruded part.



The SPE booth served as a meeting place for many of our members who attended the New York Plastics Exposition.

Temperature control is one of the most important, if not the most important factor. We found that oil and steam were the most desirable heat mediums. Electricity, with the apparatus we had, did not provide a constant temperature. The die and machine set-up are compartmented throughout to provide a close heat control and effect a gradient temperature. A gradual temperature increase is most desirable. The heat controls should be readily adjustable so that temperatures can be raised or lowered during extrusion.

Preheating of materials outside the machines has not been thoroughly investigated, although it is very probable that if properly synchronized it would be very beneficial—particularly with improved materials.

Although there have been suggestions that it might be best to extrude thermosets not fully cured, then after-bake to complete the cure, the author is of the opinion that the best method and product is had when the extruded piece emerges from the die fully cured (commercially cured). Acetone extraction and boiling tests have again and again established that this can be done. The danger of releasing flow stresses with an after-bake is always imminent.

The rate of extrusion is, of course, dependent upon various factors such as material, temperatures, cross-sections, length of die, and so on. Some of the rates of extrusion that were used to produce good products experimentally were:

5" tubing, ¼" wall—3½ inches/min.
3" tubing, ¼" wall—4 inches/min.
½" rod—12 inches/min.

These rates could undoubtedly be appreciably increased with improved set-ups.

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MEMBERSHIP ROSTER

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Buffalo 6, N. Y.

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4455 Genesee St.
Buffalo, N. Y.

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HERMAN GREEN
1419 East & West Rd.
Ebenezer, N. Y.

JAMES T. GREY, JR.
Sr. Process Engr.
Cornell Aeronautical Lab.
4455 Genesee St.
Buffalo 5, N. Y.

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Niagara Falls, N. Y.

ROBERT H. JEEVES
Durez Plastics & Chem. Inc.
Walck Road
N. Tonawanda, N. Y.

ELLIS C. KNOBLOCH
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Spaulding Fibre Co., Inc.
Tonawanda, N. Y.

WILLIAM R. KOLZ
Heckman Plastics Corp.
333 Old Falls Blvd.
N. Tonawanda, N. Y.

CHARLES H. LARKIN II
Sales Engr.
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250 Delaware Ave.
Buffalo 2, N. Y.

GARSON MEYER
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JOHN E. MINER
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Tonawanda, N. Y.

HAIMAN S. NATHAN
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52 Pearl St.
Buffalo, N. Y.

W. J. NEELON
Mfg. Representative
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18 Capen Blvd.
Buffalo 14, N. Y.

JAMES C. ORR
546 Delaware
Buffalo 2, N. Y.

C. C. PICKERING, JR.
Field Engr.
Durite Plastics Inc.
Frankford Station P. O.
Philadelphia 24, Pa.

PHILIP K. PORTER
Head-Material Dept.
Cornell Aeronautical Lab.
4455 Genesee St.
Buffalo 5, N. Y.

ROWLAND F. POTTER
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Potter & Dugan Inc.
29 Wilkeson St.
Buffalo 2, N. Y.

MERLE S. RATHBUN
Rathbun Molding Co.
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Plastics Engr.
General Prod. Corp.
Union Springs, N. Y.

EDWIN ROBERTSON
Factory Supt.
Atlas Plastics Inc.
52 Pearl St.
Buffalo, N. Y.

EUGENE C. ROECK
Technical Sales Repr.
Durez Plastics & Chem., Inc.
Walck Road
N. Tonawanda, N. Y.

E. A. RUSSELL
Engineer
Spaulding Fibre Co., Inc.
310 Wheeler St.
Tonawanda, N. Y.

IRVING W. SCHULTZ
Elixor Mfg. Co.
1200 Niagara St.
Buffalo 13, N. Y.

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Buffalo 16, N. Y.

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Partner
Industrial Equip. Co.
170 Franklin St.
Buffalo, N. Y.

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Mgr.
Organic Tech. Div.
The Carborundum Co.
Niagara Falls, N. Y.

H. G. VALENTINE
Sales Mgr.
Norton Laboratories Inc.
Lockport, N. Y.

RICHARD R. VAN GEEM
Engineer
Sterling Injection
Molding Inc.
277 Military Rd.
Buffalo 7, N. Y.

NORMAN E. WAHL
Technical Dir.
Rex Plastics Co.
157 Reading St.
Buffalo 5, N. Y.

FRED W. WALTS
General Prod. Corp.
Box 254
Union Springs, N. Y.

ROBERT D. WEBSTER
Buffalo Plastics Co.
1200 Niagara St.
Buffalo 13, N. Y.

VERNON E. WHITMAN
Garflex Co.
154 Clarisa St.
Rochester 8, N. Y.

RALPH E. WOLF
Lab. Technician
Spaulding Fibre Co.
310 Wheeler St.
Tonawanda, N. Y.

CENTRAL OHIO SECTION

CLARE E. BACON
Chemist
Owens-Corning Fiberglas Corp.
Newark, Ohio

RONALD D. BECK
Plastic Development Engr.
Plastics Div.
Continental Can Co.
Cambridge, Ohio

WILLIAM J. BRALEY
Secretary-Treasurer
Columbus Plastic Products Inc.
519 Dublin Ave.
Columbus 15, Ohio

M. W. BURKHART
Manager
Newark Plastic Engrg. Co.
130 E. Locust St.
Newark, Ohio

JOHN E. BUSH
Plastics Division
Hydraulic Press Mfg. Co.
Mount Gilead, Ohio

LaVERNE E. CHEYNEY
Research Engineer
Battelle Memorial Institute
Columbus 1, Ohio

DICK V. CONNER
Engineer
Continental Can Co.
Cambridge, Ohio

ROBERT L. DAVIS
District Engineer
Plastic Mfgr. Inc.
Cambridge, Ohio

LEONARD MARK DURRETT
Molding Supt.
Columbus Plastic Prod. Inc.
519 Dublin Ave.
Columbus, Ohio

CHARLES A. EBNER
General Manager
Yardley Plastics Co.
142 Parsons Ave.
Columbus, Ohio

GEORGE N. EDWARDS
President & Gen. Mgr.
The Ohio Plastic Co.
Frazeysburg, Ohio

RICHARD J. FRANCIS
Chemical Engineer
Owens-Corning Fiberglas Corp.
Newark, Ohio

DAN S. GRIFFITH
Asst. Manager
Kline Mfg. Co.
R.#2, Galena, Ohio

W. GUNNERSON
Asst. Manager
Yardley Plastics Co.
142 Parsons Ave.
Columbus 15, Ohio

JOHN E. HENRY
Asst. Chief Engr.
Continental Can Co.
Cambridge, Ohio

FREDERICK B. HILL, JR.
Owner
Yardley Plastics Co.
142 Parsons Ave.
Columbus 15, Ohio

BORDEN HIVELY
Plastics Consultant
50 W. Broad St.
Columbus 15, Ohio

JAMES HOAG
Gen. Foreman Elec. Maint.
Continental Can Co.
Cambridge, Ohio

WALTER E. JACOBSON
Adm. Staff Asst.
Yardley Plastics Co.
138 Parsons Ave.
Columbus 15, Ohio

J. F. JAEGER
Tool Designer
Continental Can Co.
Cambridge, Ohio

LAWRENCE JAMES
Engineer
The Fabri-Form Co.
Byesville, Ohio

BEN JEROME
Plastics Eng.
Dow Chemical Co.
2314 Terminal Tower
Cleveland 13, Ohio

C. D. JONES
Plastics Technologist
Owens-Corning Fibreglas Corp.
Newark, Ohio

EDWARD A. KANAVEL
Superintendent
Ohio Plastic Co.
Frazeysburg, Ohio

CLARENCE H. KEHL
Tool Engineer
Continental Can Co.
Cambridge, Ohio

GEORGE W. KELLY
Supt.
Columbus Plastics Prod.
519 Dublin Ave.
Columbus, Ohio

G. W. KENY
Pres. & Genl. Mgr.
Columbus Plastic Prod. Inc.
519 Dublin Ave.
Columbus 15, Ohio

J. W. KNIGHT
President
The Fabri-Form Co.
Byesville, Ohio

E. L. LAUGHLIN
Chief Chemist
The Pharis Tire & Rubber Co.
25 S. 11th St.
Newark, Ohio

PAUL J. McBRIDE
Finishing Supt.
Columbus Plastic Prod. Inc.
519 Dublin Ave.
Columbus 15, Ohio

MERLE E. MOUSER
Prod. Technologist
Owens-Corning Fiberglas Corp.
Case Ave.
Newark, Ohio

HARRY R. PARSONS
Sales
Owens-Corning Fiberglas Corp.
714 Dixie Terminal Bldg.
Cincinnati 2, Ohio

RALPH M. REEL
V. Pres. Research & Dev.
Pharis Tire & Rubber Co.
Newark, Ohio

R. W. ROSEL
Sales Mgr.
Yardley Plastics
138 Parsons Ave.
Columbus 15, Ohio

MILLER G. SHERWOOD
Mich. Plastics Prods., Inc.
Grand Haven, Michigan

H. CHARLES SIMONS
Sales Engineer
The Ohio Plastic Co.
Frazeysburg, Ohio

DONALD J. WEBER
Head Research & Dev.
Yardley Plastics Co.
142 Parsons Ave.
Columbus, Ohio

ROBERT W. ZARING
Purchasing Agent
Continental Can Co.
Cambridge, Ohio

CHICAGO SECTION

RAYMOND M. ALDEN
Treasurer
Globe Imperial Corp.
2025 Kishwaukee St.
Rockford, Ill.

LECLARE H. AMRINE
President
Imperial Molded Prod. Corp.
2925 W. Harrison St.
Chicago 12, Ill.

ROSCOE S. AMRINE
Sales Manager
Imperial Molded Prod. Corp.
2925 W. Harrison St.
Chicago 12, Ill.

E. L. ANDERSON
President
Globe Imperial Corp.
2025 Kishwaukee
Rockford, Ill.

LLOYD WM. ANDERSON
Prod. Mgr.
Chicago Molded Prod. Corp.
1020 N. Kolmar Ave.
Chicago 51, Ill.

B. D. ASHBAUGH
Sales Engineer
Hydraulic Press Mfg. Co.
201 N. Wells
Chicago, Ill.

EDW. F. BACHNER, JR.
President
Chicago Molded Prod. Corp.
1020 N. Kolmar Ave.
Chicago, Ill.

G. L. BACHNER
V. P. & Treas.-Factory Mgr.
Midland Die & Engraving Co.
1800 Berenice Ave.
Chicago, Ill.

JOHN J. BACHNER
V. Pres. & Sales Mgr.
Chicago Molded Prod. Corp.
1020 N. Kolmar Ave.
Chicago 51, Ill.

BARTON L. BATTY
Mgr. Plastics
Cook Paint & Varnish Co.
7332½ S. Phillips Ave.
Chicago 49, Ill.

CHARLES A. BAUER
Vice President
Hoosier Cardinal Corp.
Evansville 7, Ind.

RAY C. BAUSPIES
Partner
Midwest Molding & Mfg. Co.
319 N. Whipple St.
Chicago 12, Ill.

DONALD K. BAXTER
Engineer
The Richardson Co.
27th Ave. & Lake St.
Melrose Park, Ill.

HOMER J. BEACH
Molding Foreman
Harry Davies Molding Co.
1428 N. Wells St.
Chicago 10, Ill.

JOHN T. BENT
Salesman
Tenn. Eastman Corp.
228 N. LaSalle St.
1564 Builders Bldg.
Chicago 1, Ill.

STANLEY R. BLACKWELL
Foreman
Victory Mfg. Co.
1722 W. Arcada Pl.
Chicago 17, Ill.

RALPH E. BLANCHARD
Asst. Manager
Stinson A'G'A Plastics
309 N. Justine St.
Chicago 7, Ill.

MILTON W. BLOOM
Perfex Plastics
4344 S. Wentworth
Chicago, Ill.

D. BRADFORD BLOSSOM
President & Treasurer
Master Plastic Molding Corp.
1609 N. Broadway
St. Louis 6. Mo.

CLAUDE RENE BLUZAT
Field Engineer
Bauman & Bluzat
2753 W. North Ave.
Chicago 47, Ill.

G. WALTER BORKLAND
Owner
Borkland Laboratories
Sycamore Lake
Marion, Indiana

LEE T. BORDNER
Chicago Molded Prod. Co.
10376 Ashton Ave.
Los Angeles 24, Calif.

CARL G. BORNSEN
Production Mgr.
Continental Plastics Corp.
308-314 W. Erie St.
Chicago 10, Ill.

ROBERT BOWMAN
Tool Designer
North Amer. Aviation Inc.
Inglewood, Calif.

JAMES A. BOYAJIAN
President
Product Mfg. & Eng. Corp.
3709 W. Armitage Ave.
Chicago 47, Ill.

HERMAN W. BRANDT
Partner & Gen. Mgr.
Sterling Industries
5205 W. Irving Pk. Rd.
Chicago 41, Ill.

C. F. BRAUND
Asst. General Mgr.
Modern Plastics Corp.
1050 Jennings Ave.
Benton Harbor, Mich.

ROBERT M. BROSIUS
Sales Engineer
Rohm & Haas Co.
25 E. Jackson Blvd.
Chicago 4, Illinois

ROMAN C. BROTZ
Plant Manager
Plastics Engineering Co.
1603 Geele Ave.
Sheboygan, Wis.

HERBERT L. BROWN, JR.
Chicago Die Mold Corp.
4001 Wrightwood Ave.
Chicago, Ill.

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Tech. Rep.
Rohm & Haas Co.
25 E. Jackson Blvd.
Chicago 4, Ill.

ANTON J. BRUNNER
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Chicago, Ill.

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District Sales Mgr.
Auburn Button Works
9 S. Clinton St.
Chicago 6, Ill.

ROBERT D. BUDLONG
Robert Budlong, Inc.
333 N. Michigan Ave.
Chicago 1, Ill.

C. N. CAHILL
V. President
Gits Molding Corp.
4600 W. Huron Rd.
Chicago 44, Ill.

J. F. CALEF
Chief Chemist
Automatic Elect. Co.
1033 W. Van Buren St.
Chicago 7, Ill.

BOB CAMPBELL
District Mgr.
Grigoleit Co.
919 N. Michigan Ave.
Chicago 11, Ill.

DONALD CAPLAN
Victory Mfg. Co.
1722 West Arcade Pl.
Chicago 12, Ill.

RUSSELL V. CARLSON
Plant Manager
Precision Contacts
P. O. Box 146
Minneapolis, Minn.

KENNETH W. COATES
V. Pres. & Prod. Mgr.
Plastics Service Corp.
Boston & Factory Sts.
Laporte, Ind.

ALAN S. COLE
Gen. Mgr.
Modern Plastics Inc.
122 E. 42nd St.
New York 17, N. Y.

E. J. COLEMAN
Plastics Engineer
Crane Packing Co.
1800 Cuyler Ave.
Chicago 13, Ill.

JOHN A. COLLINS
5200 Sheridan Rd.
Chicago, Illinois

JAMES M. CONNORS
Western Mgr.
Modern Plastics, Inc.
221 N. LaSalle St.
Chicago 1, Ill.

WARREN F. COOPER, JR.
Sales Rep.
Tenn. Eastman Corp.
228 N. LaSalle St.
Chicago 1, Ill.

WINFIELD T. COOPER
Sales Eng.
Bakelite Corp.
230 N. Michigan Ave.
Chicago 1, Ill.

JAMES G. CRAFTON
Foreman
Victory Mfg. Co.
1722 W. Arcade Pl.
Chicago 12, Ill.

E. H. CROISANT
Division Mgr.
Synthane Corp.
40 S. Clinton St.
Chicago 6, Ill.

EDWARD W. CRONIN
Sales Eng.
E. I. duPont de Nemours & Co.
36 S. State St.
Chicago, Ill.

C. C. DAILEY JR.
Northwest Plastics Inc.
2233 University Ave.
St. Paul, Minn.

ROBERT M. DANIELS
Draftsman
Gits Molding Co.
4600 W. Huron St.
Chicago 44, Ill.

CHARLES A. DASSING
Tech. Rep.
Bakelite Corp.
230 N. Michigan Ave.
Chicago 1, Ill.

W. V. DeCAMP
Chief Inspector
Gen. Amer. Trans. Corp.
4405 Euclid Ave.
E. Chicago, Ind.

JOHN H. DEER
Vice President
Santay Corp.
351 N. Crawford Ave.
Chicago 24, Ill.

FRANK D. DELI
Chicago Rep.
Amos Molded Plastics
221 N. LaSalle St.
Chicago 1, Ill.

JOHN DELMONTE
Tech. Director
Plastics Institute
1601 S. Western
Los Angeles 6, Calif.

FRANK J. DESORT
Production Mgr.
Midwest Molding & Mfg. Co.
319 N. Whipple St.
Chicago, Ill.

H. W. DeVORE
Mgr. Cent. District
Plaskon Div.
Libbey-Owens-Ford Glass Co.
Room 1749-400 W. Madison St.
Chicago 6, Ill.

L. F. DOBRY
Chemical Engineer
4951 W. 66th St.
Chicago, Ill.

WILLIAM T. DONAHUE
President
W. T. Donahue Assoc.
247 E. Illinois St.
Chicago, Ill.

H. A. DOOLITTLE
Engineer
Stimsonite Plastics
309 N. Justine
Chicago 7, Ill.

WILLIAM J. DRAKE
Superintendent
Santay Corp.
351 N. Pulaski Rd.
Chicago 24, Ill.

HAROLD A. DUNCAN
Sales Rep.
Celanese Plastics Corp.
1514 Merchandise Mart
Chicago 54, Ill.

P. J. DUNN, JR.
Representative
Celanese Plastics Corp.
1514 Merchandise Mart
Chicago 54, Ill.

ROBERT D. DUTHIE
Westinghouse Elec. Corp.
20 N. Wacker
Chicago 6, Ill.

EVERETT E. ECKENBECK
Treasurer
Midwest Plastic Prod. Co.
Box 275
Chicago Heights, Ill.

WHITFIELD M. ELLISON
Sales Engineer
The Richardson Co.
27th & Lake St.
Melrose Park Ill.

HUGO S. ERICKSON
President
Industrial Molded Prod. Co.
2035 Charleston St.
Chicago 47, Ill.

LUTHER J. EVANS
President
Mayfair Molded Prod. Corp.
4440 N. Elston Ave.
Chicago 30, Ill.

HOWARD G. FAIRFAX
Plastic & Mech. Engineer
Victor Mfg. & Casket Co.
5750 Roosevelt Rd.
Chicago, Ill.

RICHARD W. FARRIS
406 W. 34th St.
Kansas City 2, Mo.

IAN F. FERGUSON
Mgr. Midwest Div.
Catalin Corp.
221 N. LaSalle St.
Chicago 1, Ill.

ANDREW J. FISCHER
Lt. Comdr., U. S. Navy
Room 1500
141 W. Jackson
Chicago, Ill.

ERNEST FORST
Plastics Engineer
Barnes & Reinecke
230 E. Ohio St.
Chicago 11, Ill.

LOUIS T. FREDERICK
Contact Engineer
The Richardson Co.
Melrose Park, Ill.

HANS FREEMAN
President
Creative Plastics Eng. Co.
747 N. Paulina St.
Chicago 22, Ill.

JOHN M. FREY
District Sales Rep.
The Girdler Corp.
288 N. LaSalle St.
Chicago 1, Ill.

THEODORE FRIBERG
Plastics Engineer
National Lock Co.
1902 7th St.
Rockford, Ill.

HAROLD E. FROBERG
Sales Mgr.
Colonial Kolonite Co.
2212 W. Armitage Ave.
Chicago 47, Ill.

MICHAEL H. FROELICH
Editorial Director
Ziff-Davis Pub. Co.
185 N. Wabash Ave.
Chicago 1, Ill.

ERIK FURHOLMEN
Plant Mgr.
Superior Plastic Co.
426 N. Oakley Blvd.
Chicago 12, Ill.

HERBERT R. GALLOWAY
President
Minn. Plastics Corp.
366 Wacouta St.
St. Paul 1, Minn.

C. N. GARDNER
Asst. to President
George Morrell Corp.
Muskegon Heights, Mich.

CLARENCE W. GAULT
Tech. Sales
Hercules Powder Co.
332 S. Michigan Ave.
Chicago, Ill.

HARRY W. GEBHARD
Owner
Harry W. Gebhard Co.
737 N. Michigan Ave.
Chicago 11, Ill.

VICTOR E. GIBBENS
Associate Editor
Ziff-Davis Publishing Co.
185 N. Wabash Ave.
Chicago 1, Ill.

CHARLES J. GIGER
Mgr. Pl. Div.
Santay Corp.
351 N. Pulaski
Chicago 24, Ill.

JOSEPH A. GITS
Gits Molding Corp.
4600 W. Huron St.
Chicago 44, Ill.

JOSEPH A. GITS, JR.
Gits Molding Corp.
4600 W. Huron St.
Chicago 44, Ill.

JULES P. GITS
Secy-Treas.
Gits Molding Corp.
4600 W. Huron St.
Chicago 44, Ill.

JOSEPH M. GORDON
Manager
J. M. Gordon Lab.
479 Ave. of the Americas
New York 11, N. Y.

WILLIAM P. GULLIFORD
Sales Engineer
Santay Corp.
351 N. Pulaski Rd.
Chicago 24, Ill.

J. GURSKIS, JR.
Engineer
Western Electric Co., Inc.
Hawthorne Station
Chicago 23, Ill.

R. PAUL HAMMOND
Sales Engineer
Spaulding Fibre Co.
4757 N. Ravenswood
Chicago 40, Ill.

J. J. HARRIS
Assistant Director
Continental Can Co., Inc.
4645 W. Grand Ave.
Chicago, Ill.

RICHARD B. HARRISON
Research Eng.
Formold Co.
3145 S. Wabash
Chicago, Illinois

ROBERT W. HEALY
Sales Engineer
Consolidated Water Power
Wisconsin Rapids, Wis.

CHARLES C. HENRY
Sales Manager
Chicago Die Mold Corp.
4001 Wrightwood Ave.
Chicago 39, Ill.

K. HERBEKIAN
Plastics Engineer
Eversharp, Inc.
1800 W. Roscoe St.
Chicago 13, Ill.

CLARENCE A. HERBST
President
Resinoid Eng. Corp.
3445 Howard St.
Skokie, Ill.

WILLIAM L. HESS
Co-owner & Chief Eng.
Anesite Co.
1959 Fulton St.
Chicago 12, Ill.

JOSEPH A. HILL
Designer
Barnes & Reinecke
230 E. Ohio St.
Chicago 11, Ill.

H. E. HOFFMAN
Salesman
Breyer Molding Co.
2536 Lake St.
Chicago 12, Ill.

G. W. HOFSTETTER
Dist. Mgr.
Ferro Enameling Inc.
221 N. LaSalle St.
Chicago 1, Ill.

EUGENE B. HOLMES
Engineer
Atlas Box Maker Corp.
2555 W. Diversey Ave.
Chicago 47, Ill.

GUSTAVE HOLMGREN
126 Water Street
Sheboygan Falls, Wisc.

J. L. HOWIE, JR.
President
The Grigoleit Co.
740 E. North St.
Decatur 80, Ill.

HARRY R. HUSTED
Celanese Plastics Corp.
1514 Mdse. Mart
Chicago 54, Ill.

H. C. ISAACS
Merchandise Dev. Mgr.
Butler Brothers
Canal & Randolph Sts.
Chicago 80, Ill.

ELMER W. JOHNSON
Foreman
Midland Die & Eng. Co.
1800 W. Bernice Ave.
Chicago, Ill.

JAMES E. JOHNSTON
Field Sales Mgr.
Chicago Molded Prod. Corp.
1020 N. Kolmar Ave.
Chicago 51, Ill.

CHARLES E. JONES
President
Chas. E. Jones & Assoc.
189 W. Madison St.
Chicago 2, Ill.

PAUL P. KARNOV
Owner
Mercury Products Co.
2436 Bryn Mawr Ave.
Chicago 45, Ill.

THEO. W. KELLER
President
Howard Mfg. Corp.
1401 S. Main St.
Council Bluffs, Ia.

WILLIAM L. KELLY
Plastic Engineer
Gen. Industries Co.
The Haas Corp.
111 W. Monroe St., RM. 2009
Chicago 3, Ill.

EARL RAYNER KEOWN
Secretary & Prod. Mgr.
Santay Corp.
351 N. Crawford Ave.
Chicago 24, Ill.

C. D. KERR, JR.
Asst. Sales Manager
Nixon Nitration Works
55 E. Washington Ave.
Chicago 2, Ill.

ROY W. KINSEY, JR.
Tool & Die Designer
Midland Die & Engraving Co.
1500 W. Berenice St.
Chicago, Ill.

CHARLES W. KLEIDERER
Director of Research
Ideal Plastics Co.
184-10 Jamaica Ave.
Jamaica, L.I., N. Y.

IRVING N. KLEIN
Purchasing Agent
H. Muehlstein & Co., Inc.
327 S. LaSalle St.
Chicago 4, Ill.

ORREN W. KNIGHT
Project Engineer
Eureka Williams Corp.
Bloomington, Ill.

CARLO D. KOSKI
Minn. Honeywell Reg. Co.
2743 Fourth Ave.
Minneapolis 8, Minn.

J. H. KREHBIEL
Partner
Molex Products Co.
400 N. Harding Ave.
Chicago 32, Ill.

ALFRED F. KUTHE
Works Mgr.
Rada Products Co.
2911 Carroll Ave.
Chicago 12, Ill.

OSCAR LEE
Owner
226 S. Wabash
Chicago 4, Ill.

CARL J. LIND
President
Lind Plastics Products
4455 W. Rice St.
Chicago 53, Ill.

RUSSELL T. LINDHOLM
Technical Rep.
Chicago Molded Prod. Corp.
1020 N. Kolmar Ave.
Chicago 51, Ill.

RICHARD JOSEPH LINEHAN
Vice-Pres.—Sales Mgr.
Continental Plastic Corp.
308 W. Erie St.
Chicago, Ill.

WALTER B. LONGACRE
Sales Engineer
Bakelite Corp.
230 N. Michigan Ave.
Chicago 1, Ill.

ARTHUR F. LOVGREN
Toolrm. Foreman & Designer
Industrial Molded Prod. Inc.
2035 Charleston
Chicago 47, Ill.

EUGENE D. LUKASIK
Molding Foreman
Chicago Molded Prod. Corp.
1020 N. Kolmar Ave.
Chicago 51, Ill.

ALLAN McCONNELL, JR.
Designer - Draftsman
Victory Mfg. Co.
1722 W. Arcade Pl.
Chicago 12, Ill.

CLARENCE McCORMICK
Sales Engineer
Superior Plastics Co.
426 N. Oakley Blvd.
Chicago, Ill.

W. E. McCORMISH
Branch Manager
L. Albert & Son
120 S. LaSalle St.
Chicago 3, Ill.

PHILIP J. McGOOHAN
4100 Keystone Ave.
Chicago 1, Illinois

ALVA B. McINTYRE
Salesman
Croname Inc.
3701 N. Ravenswood
Chicago, Ill.

JOHN MACK
Partner
John Mack & Son
6227 N. Broadway
Chicago 40, Ill.

WILLIAM H. MAHLE
Vice-President
N. W. Plastics Inc.
2233 University Ave.
St. Paul 4, Minn.

OTTO MAKERT
Tool Room Foreman
Rada Product Co.
2911 Carroll Ave.
Chicago 12, Ill.

GERARD F. MANGIN
Supt. Plastics Div.
Cinch Mfg. Corp.
2335 W. Van Buren St.
Chicago, Ill.

CLARENCE F. MARTIN
Western Mgr.
Mica Insulator Co.
600 W. Van Buren St.
Chicago 7, Ill.

EDMUND W. MARTIN
Chemical Engineer
Quality Molders
4475 Grand Ave.
Western Springs, Ill.

C. F. MASSOPUST
Supt. Plastics Div.
Gen. American Trans. Corp.
4405 Euclid Ave.
E. Chicago, Ind.

ELMER C. MAYWALD
Owner
Plastics Consultant
11 S. LaSalle St.
Chicago 3, Ill.

JOSEPH L. MEGACZ
Gits Molding Corp.
4600 W. Huron St.
Chicago 44, Ill.

JOHN G. MEILER
Director
Plywood Research Fdn.
620 E. 26th St.
Tacoma, Wash.

R. J. MEISEL
Injection Dept. Sup.
Gen. Amer. Trans. Corp.
4405 Euclid Ave.
E. Chicago, Indiana

MAURICE MELTZER
Vice-President
Service Plastics Inc.
1120 W. Jackson Blvd.
Chicago, Ill.

J. D. MICHEL
Plastics Plant Mgr.
Gen. Amer. Trans. Corp.
4405 Euclid Ave.
E. Chicago, Indiana

E. JEAN BLANC MILLER
Designer
Barnes & Reinecke
230 E. Ohio
Chicago 11, Ill.

NELS A. MILLER
Designer
J. P. Seeburg Corp.
1510 N. Dayton St.
Chicago 22, Ill.

RALPH L. MILLER
Cleveland Varnish Co.
Cleveland, Ohio

WALTER MILLER
Owner
Modern Plastics Corp.
Box 666
Benton Harbor, Mich.

WILLARD L. MITCHELL
Asst. Field Sales Mgr.
Chicago Molded Prod. Corp.
1020 N. Kolmar Ave.
Chicago 51, Ill.

JOHN B. MOLITOR
Northern Mgr.
Valite Division
Valentine Sugars
4000 W. Madison St.
Chicago 6, Ill.

JOHN B. MOSAK
Supt. Tool & Die Div.
Nu-Dell Mfg. Co.
2250 N. Pulaski
Chicago, Illinois

JOHN A. MOSCHNER
Industrial Eng.
Chicago Die Mold Corp.
4001 Wrightwood Ave.
Chicago 30, Ill.

S. K. MOXNESS
Chief Process Eng.
Minn. Honeywell Reg. Co.
2700 4th Ave.
S. Minneapolis, Minn.

A. W. NELSON
President
Rada Products Co.
2911 Carroll Ave.
Chicago 12, Ill.

MELVEN V. NELSON
Superintendent
Autopoint Company
1801 Foster Ave.
Chicago 40, Ill.

LEWIS R. NICCUM
Minn. Honeywell Reg. Co.
2753 Fourth Ave.
Minneapolis, Minn.

ROBERT E. NICHOLL
2908 N. Clybourne Ave.
Chicago 18, Ill.

J. O. NISSEN
Br. Mgr. Plastics
Monsanto Chemical Co.
435 N. Michigan Ave.
Chicago 6, Ill.

CURT E. NYBERG
Chief Checker
Barnes & Reinecke
230 East Ohio
Chicago 11, Illinois

ROY J. O'CONNELL
President
Keefe Belting Co.
25 S. Desplaines St.
Chicago 6, Ill.

C. R. OLSON
Sales-Molding Compound
Interlake Chemical Corp.
332 S. Michigan Ave.
Chicago, Ill.

R. J. OLSON
Supt.
Federal Tool Corp.
412 N. Leavitt St.
Chicago 12, Ill.

T. R. ORME
Technical Rep.
Bakelite Corp.
230 N. Michigan Ave.
Chicago 1, Ill.

RALPH C. OSBORN
Chief Engineer
Eureka Williams Corp.
1201 E. Bell St.
Bloomington, Ill.

FREDERICK Z. PEARSON
Mgr. Plastics Div.
Lyon Metal Products, Inc.
P. O. 671
Aurora, Ill.

R. C. PELZ
Gen. Manager
Victory Mfg. Co.
1722 W. Arcade Place
Chicago, Ill.

HARRY J. PERZAN
Co-Partner
Dot-Lee Tool & Eng.
4335 W. Armitage Ave.
Chicago 39, Ill.

RAYMOND F. PHILLIPS
Tool Engineer
Chicago Molded Prod. Corp.
1020 N. Kolmar Ave.
Chicago, Ill.

JOSEPH D. PIERCE
Asst. Research Eng.
Crane Co.
836 S. Michigan Ave.
Chicago 5, Ill.

R. F. PIERCE
Design Supervisor
The Visking Corp.
6733 W. 65th St.
Chicago 38, Ill.

ROBERT PLATT
District Manager
F. J. Stokes Machine Co.
20 N. Wacker Drv.
Chicago 6, Ill.

ROBERT D. PLOWRIGHT
General Mgr.
Plastic Sales Eng. Co.
208 N. Waller Ave.
Chicago, Ill.

JACK W. PORTE
Tech. Eng.
Monsanto Chem. Co.
1517 Tribune Tower
Chicago 11, Ill.

N. H. PORTE
Product Cont.
Gen. Amer. Trans. Corp.
4405 Euclid Ave.
E. Chicago, Ind.

M. L. POUST
Research Eng.
Cruver Mfg. Co.
2460 W. Jackson Blvd.
Chicago, Ill.

WALTER S. PRENDEGAST
Plant Eng.
Sandee Mfg. Co.
3945 N. Western Ave.
Chicago 18, Ill.

THOMAS A. PREPELICA
Superintendent
Midwest Molding & Mfg. Co.
319 N. Whipple St.
Chicago, Ill.

R. F. PRIEST, II
Mgr. Injection
Chicago Plastics Prod. Co.
210 W. Evergreen St.
Chicago 10, Ill.

J. O. REINECKE
Partner
Barnes & Reinecke
230 East Ohio St.
Chicago 11, Illinois

T. E. RICHARDS
Partner
Midwest Molding & Mfg. Co.
319 N. Whipple St.
Chicago 12, Ill.

JOHN L. RIE
Cost & Development Eng.
Sears Roebuck & Co.
Homan & Arthington
Chicago, Ill.

EDWARD G. RIX
Vice-President
Pierce Wrapping Mach. Co.
625 W. Jackson Blvd.
Chicago 6, Ill.

I. P. RODMAN, JR.
Chief Plastics Engineer
Aeromotive Engineering Co.
9th & Maple Sts.
Niles, Michigan

H. L. ROESSLER
H. L. Roessler Co.
737 Center St.
Elgin, Ill.

EDWARD ROGAN
Partner
Rogan Brothers
2001 S. Michigan Ave.
Chicago 16, Ill.

JULIAN J. ROGAN
Partner
Rogan Brothers
2001 S. Michigan Ave.
Chicago 16, Ill.

NICHOLAS A. ROGAN
Partner
Rogan Brothers
2001 S. Michigan Ave.
Chicago 16, Ill.

LEE M. ROGERS
Chicago Rep.
Farley & Loetscher Mfg. Co.
908 W. Cullerton St.
Chicago 8, Ill.

LIEF A. ROWE
William Thorenson Co.
2035 Wabansia Ave.
Chicago 47, Ill.

FRANK C. ROWLEY
Sales Engineer
Durez Plastics & Chem. Inc.
221 N. LaSalle St.
Chicago 1, Ill.

N. E. RUNDEGREN, JR.
Midland Die & Eng. Co.
1800 Berenice Ave.
Chicago 13, Ill.

J. E. RUSSELL
Mgr. Plastics Div.
Dow Chemical Co.
135 S. LaSalle St.
Chicago 3, Ill.

PHIL H. SANDERS
Vice-Pres. & Mgr.
Sobenite Inc.
1026 W. King St.
S. Bend, Indiana

M. R. SANGERMAN
General Mgr.
Nu-Dell Plastics Corp.
2250 N. Pulaski Rd.
Chicago 39, Ill.

JOHN SAYLES
Sales Engineer
Chicago Molded Prod. Corp.
1020 N. Kolmar Ave.
Chicago, Ill.

LENARD SCHEFF
President
Industrial Arts Inc.
660 W. Grand Ave.
Chicago 10, Ill.

CARL W. SCHOLL
Chg. Experimental Dept.
The Scholl Mfg. Co.
213 W. Schiller St.
Chicago 10, Ill.

ARTHUR J. SCHULTZ
1907 Berteau Ave.
Chicago 13, Ill.

CHARLES A. SCOGLAND
Plastic Mgr.
Studebaker Corp.
South Bend, Ind.

FRANK C. SEEBART
Research Chemist
American Marietta Co.
901 N. Greenwood
Kankakee, Ill.

H. S. SHAFFER, JR.
Vice-Pres., Gen. Mgr.
Badger Plastic Inc.
Elkhart Lake, Wisc.

FRED K. SHANKWEILER
Hercules Powder Ave.
332 S. Michigan Ave.
Chicago, Ill.

T. W. SHARP
Mgr. Sheet & Foil Div.
Bakelite Corp.
30 E. 42nd St.
New York 17, N. Y.

EDWARD SINGER
President
Victory Mfg. Co.
1722 W. Arcade Place
Chicago 12, Ill.

DOMINIC R. SIRAGUSA
President
Molded Prod. Corp.
4533 W. Harrison St.
Chicago 24, Ill.

EDWIN H. SMITH, JR.
Plastics Engineer
Eversharp Inc.
1800 Roscoe St.
Chicago, Ill.

HAROLD T. SORENSEN
Sales Engineer
Spaulding Fibre Co., Inc.
4770 Lincoln Ave.
Chicago, Ill.

PAUL SPODNYAK
President
Uptown Tool Works Inc.
4632 Fullerton Ave.
Chicago 39, Ill.

CORTES N. SPRANKLE
Product Dev.
Sandee Mfg. Co.
5050 Foster Ave.
Chicago, Ill.

ROBERT S. STEPHENS
Sales Engineer
Kurz-Kasch Inc.
608 S. Dearborn St.
Chicago, Ill.

WALTER L. STERCZEK
Tool Die & Mold Maker
1420 N. Talman Ave.
Chicago 22, Ill.

BROOKS STEVENS
Brooks Stevens Ind. Designer
340 N. Milwaukee Ave.
Milwaukee 2, Wisc.

WALTER H. STOEFFHAAS
President
Colonial Kolonite Co.
2212 W. Armitage Ave.
Chicago, Ill.

CLARENCE H. STOWE
Sr. Partner
Stowes Plastic Prod.
3118 W. Atkinson Ave.
Milwaukee 9, Wisc.

RICHARD V. D. STRONG
Asst. District Mgr.
F. J. Stokes Machine Co.
20 N. Wacker Dr.
Chicago 6, Ill.

EDMOND P. STROTHMAN
Industrial Engineer
A. O. Smith Corp.
310 S. Michigan Ave.
Chicago 4, Ill.

FRED D. SWANSON
Chief Engineer
Chicago Molded Prod. Corp.
1020 N. Kolmar Ave.
Chicago, Illinois

L. J. SWIFT
Production Mgr.
Sandee Mfg. Co.
3945 N. Western Ave.
Chicago 18, Ill.

DANIEL SZANTAY
President
Santay Corp.
351 N. Crawford Ave.
Chicago 24, Ill.

ELMER D. SZANTAY
General Mgr.
Sandee Mfg. Co.
3945 N. Western Ave.
Chicago 18, Ill.

DAVID W. TERRILL
Asst. Chief Eng.
Harry Davies Mold Co.
1428 N. Wells St.
Chicago 10, Ill.

JACK W. THOMSEN
Partner
J. Warren Thomsen Assoc.
105 W. Adams St.
Chicago 3, Ill.

MILTON Z. THORSON
Red Spot Paint & Varnish Co.
110 Main St.
Evansville 8, Ind.

T. F. TIBBETT
Salesman
Celanese Plastics Corp.
1514 Mdse. Mart
Chicago, Ill.

PAUL C. TIETZ
Sales Manager
The Richardson Co.
27th & Lake St.
Melrose Park, Ill.

JAMES D. TRIBBLE
General Manager
Howard Plastics, Inc.
2600 Grand Ave.
Kansas City 8, Mo.

JOHN F. VOLIN
Tech. Field Eng.
Spaulding Fibre Co., Inc.
4757 Ravenswood
Chicago, Ill.

A. H. VOSS
Stat. Appar. Plas. Eng.
Western Electric Co.
Dept. 7616, Archer Ave.
Chicago, Ill.

KENNETH OWEN WATERMAN
Plastics Dept. Foreman
G.M. Lab.
4326 N. Knox Ave.
Chicago 41, Ill.

STANLEY C. WATSON
Vice President
Raymond Laboratories, Inc.
261 E. Fifth St.
St. Paul 1, Minn.

C. R. WEBSTER
Dir. of Research
Sunlite Mfg. Co.
3724 W. Wisconsin Ave.
Milwaukee 8, Wisc.

ALEXANDER C. H. WEISS
President
W. W. Sales Corp.
1775 Wilson Ave.
Chicago, Ill.

GERALD J. WELCH
Tech. Representative
Bakelite Corp.
230 N. Michigan Ave.
Chicago, Ill.

W. A. WERNER
President
Werner Mfg. Co.
9020 Brookfield Ave.
Brookfield, Ill.

W. A. WEYMOUTH
V. Pres. Plastics Div.
National Lock Co.
1902 Seventh St.
Rockford, Ill.

C. C. WHITACRE
President
Midwest Plastic Prod. Co.
29th & Butler St.
Chicago Hts., Ill.

DOUGLAS G. WILSON
Dist. Sales Rep.
Consol. Molded Prod. Corp.
549 W. Randolph St.
Chicago 6, Ill.

FORREST WILSON
Designer
Barnes & Reinecke
230 E. Ohio St.
Chicago, Ill.

H. A. WINKELMANN
Tech. Director
Dryden Rubber Co.
1014 S. Kildare Ave.
Chicago, Ill.

E. O. WOKECK
V. Pres. & Gen. Mgr.
Bangor Plastics Inc.
Bangor, Michigan

EDWIN E. WOODMAN
District Manager
Durez Plastics & Chem. Inc.
221 N. LaSalle St.
Chicago, Ill.

WILLIAM K. WOODRUFF
Mid-West Dist., Sales Mgr.
Celanese Plastics Corp.
1514 Mdse. Mart
Chicago, Ill.

JAMES F. WOODWARD
Ziff-Davis Publ. Co.
540 N. Michigan Ave.
Chicago 11, Ill.

C. E. WRIGHT
Superintendent
Industrial Molded Prod.
2035 W. Charleston St.
Chicago, Ill.

VAL WRIGHT
Midwestern Editor
Modern Plastics
221 N. LaSalle St.
Chicago 1, Ill.

JAMES ZACHARIAS
Purch. Agt.
Industrial Arts Inc.
660 W. Grand Ave.
Chicago 10, Ill.

JUSTIN ZENNER
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Plas. Ind. Equip. & Sup.
833 W. Sheridan Rd.
Chicago 13, Ill.

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Ackerman Plastic Molding
986 East 200th St.
Cleveland 19, Ohio

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DWIGHT M. ANDERSON
Engineering
1387 Winston Road
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1120 Carnegie
Cleveland 22, Ohio

THEODORE J. BANGERT
Lab. Tech.
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Cleveland 4, Ohio

RALPH O. BAUER
Bauer & Herriman
12411 Euclid Ave.
Cleveland 6, Ohio

LAWRENCE A. BEDFORD
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East Market St.
Akron, Ohio

ROBERT C. BEGGS
District Mgr.
Modern Plastics, Inc.
1012 N.B.C. Bldg.
Cleveland 14, Ohio

ALBERT BELSHAW
Partner
H. B. Machine & Tool Co.
7113 Euclid Avenue
Cleveland 3, Ohio

WILLIAM J. BERGIN
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Monsanto Chemical Co.
427 Fisher Bldg.
Detroit, Michigan

HARRY E. BOLLINGER
Vice-President
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2711 Church Ave.
Cleveland 13, Ohio

OSCAR P. BOWLES
Chemist
Flintkote Company
East Rutherford, N. J.

L. F. BRITTON
Supt.
Ackerman Plastic Molding
986 E. 200th St.
Cleveland, Ohio

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Carter Products Corp.
6921 Carnegie Ave.
Cleveland 3, Ohio

H. E. BUECKEN
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Akron 11, Ohio

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Cleveland, Ohio

H. C. CLAFLIN
Mgr. Chem. Div.
Johnson & Jennings Co.
877 Addison Road
Cleveland, Ohio

B. CLAUS
Branch Mgr.
Celanese Plastics Corp.
720 Euclid Ave.
Cleveland 14, Ohio

LYNDON C. COLE
Chief Engr.
Cleveland H.P.M. Engr. Div.
2711 Church Ave.
Cleveland, Ohio

ROY W. COLLIER
Senior Draftsman
Lester Engineering Co.
1012 Engineers Bldg.
Cleveland 13, Ohio

HARRY H. DAVIDSON
Supervisor
Goodyear Tire & Rubber Co.
Akron, Ohio

ROBERT L. DAVIDSON
Sales Representative
Owens-Corning Fiberglas Corp.
825 Hanna Bldg.
Cleveland, Ohio

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Cleveland 6, Ohio

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805 United Bank Bldg.
Cleveland, Ohio

WM. R. DIAL
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Pittsburgh Plate Glass
Columbia Chemical Div.
Barberton, Ohio

CLARENCE DORN
International Molded Plastics
4383 W. 35th St.
Cleveland 9, Ohio

HERBERT A. ENDRES
Asst. Dir. of Research
Goodyear Tire & Rubber Co.
1144 E. Market St.
Akron, Ohio

HAROLD F. ENGLER
Sales Engr.
B. F. Goodrich Chem. Co.
324 Rose Bldg.
Cleveland 15, Ohio

MARION A. FATE
B. F. Goodrich Chem. Co.
Akron, Ohio

FRANKLIN L. FINE
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Rohm & Haas Co.
12227 Clifton Blvd.
Lakewood 7, Ohio

R. S. FISHER
Dist. Mgr.
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524 Engineers Bldg.
1365 Ontario St.
Cleveland, Ohio

G. A. FOWLES
Sales Mgr.
B. F. Goodrich Chemical Co.
324 Rose Bldg.
Cleveland, Ohio

WM. P. FRAKES
Engineer
Goodyear Tire & Rubber Co.
East Market St.
Akron, Ohio

LOUIS T. FRIEDMAN
Ackerman Plastic Molding
986 East 200th St.
Cleveland 19, Ohio

DALE C. GERBER
Development Engr.
The Hoover Co.
North Canton, Ohio

C. C. GILDERSLEEVE
Treasurer
Precision Molded Plastics, Inc.
2014 West 53rd St.
Cleveland, Ohio

HOWARD E. GOODYEAR
Owner
Goodyear Tool and Die Co.
5700 Detroit Ave.
Cleveland 2, Ohio

GEORGE V. GOULDER
International Molded Plastics
4383 West 35th St.
Cleveland 9, Ohio

HERBERT G. GOULDER
International Molded Plastics
4383 West 35th St.
Cleveland 9, Ohio

E. G. GRAY
Sales Mgr.
General Electric Co.
Laminated Products
#1 Plastics Ave.
Pittsfield, Mass.

E. ROBERT HAINES
Plastic Engr.
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2314 Terminal Tower
Cleveland 13, Ohio

HAROLD B. HANEY
Dist. Sales Engr.
Haveg Corp.
550 Leader Bldg.
Cleveland 14, Ohio

F. C. HAYS
Sales Engineer
The Chemical Rubber Co.
2310 Superior Ave.
Cleveland, Ohio

CARL E. HEIL
Heil Engrg. Co.
12901 Elinwood Ave.
Lakewood 7, Ohio

FRANK R. HELFRICH
Vice-Pres. Sales
Prince Industrial Plastics
8107 Grand Ave.
Cleveland 4, Ohio

E. E. HESTON
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916 Sweitzer Ave.
Akron, Ohio

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Cleveland 5, Ohio

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Vice-Pres.
B. F. Goodrich Chemical Co.
324 Rose Bldg.
Cleveland 15, Ohio

BOYD R. HOPKINS
Dist. Representative
The Girdler Corp.
1836 Euclid Ave.
Cleveland 15, Ohio

GEORGE J. HUEBNER
Industrial Plastics
2460 Fairmount Blvd.
Cleveland 6, Ohio

RUSSELL B. JONES
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Rajah Mfg. Co.
643 N. Main St.
Akron 10, Ohio

ERIC W. JOHNSON
Plastic Engineering, Inc.
8506 Lake Ave.
Cleveland 2, Ohio

WALTER D. JOHNSON
Jack & Heintz Inc.
Cleveland 1, Ohio

WILLIAM JOHNSON
Production Mgr.
Plastic Engineering Inc.
8506 Lake Ave.
Cleveland 2, Ohio

RICHARD D. KIDNEY
President
Plastic Design & Dev. Co.
905 Carnegie Hall
1220 Huron Rd.
Cleveland 15, Ohio

DEWEY KILGORE
Sp. Process Engr.
American Hard Rubber Co.
Butler, N. J.

HAROLD D. KING
American Hard Rubber Co.
P.O. Box 510
Akron, Ohio

STEVEN A. KLEIN
Supt-Co-Owner
Atlas Plastics Co.
3015 Woodhill Rd.
Cleveland 4, Ohio

JOSEPH W. KNEIER
1524 Sheridan Rd.
South Euclid, Ohio

ROBERT H. KITTMER
Mgr.
The Glenn L. Martin Co.
Baltimore 3, Md.

ELMER J. KRIZEK
Gen. Mgr.
House of Plastics
735 Carnegie Ave.
Cleveland, Ohio

RICHARD M. LANE
Sales Mgr.
Johnston and Jennings Co.
877 Addison Road
Cleveland, Ohio

GREGG C. LANGERMEIER
Supt.
Pioneer Mold Co.
9227 Clinton Rd.
Cleveland 9, Ohio

HOMER D. LANSDOWNE
Chemaco Corp.
515 Swetland Bldg.
Cleveland 15, Ohio

NATHAN LESTER
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Lester Eng. Co.
2711 Church Ave.
Cleveland 13, Ohio

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President
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Lakewood 7, Ohio

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Ft. Madison, Iowa

CARL F. LINN
Dist. Mgr.
Watertown Mfg. Co.
858 Hanna Bldg.
Cleveland 15, Ohio

FRED W. LUTHER
Sales Engr.
Consolidated Molded Prod.
4614 Prospect Ave.
Cleveland 3, Ohio

WILLIAM W. LYTLE
Partner
Lytle Engineering Co.
4500 Euclid Ave.
Cleveland 3, Ohio

E. D. McCURDY
Secretary
Plastics Processes, Inc.
2500 Terminal Tower
Cleveland 13, Ohio

ROBERT J. McCUTCHEON
Section Mgr.
Goodyear Tire & Rubber
1144 E. Market St.
Akron 5, Ohio

J. HOWARD McINTOSH
National Screw & Mfg. Co.
2440 East 75th St.
Cleveland 4, Ohio

WENDELL McMAHILL
Plastic City
1510 Euclid Ave.
Cleveland, Ohio

JOHN O. McWILLIAMS
President
Plastic Engr. Inc.
8506 Lake Ave.
Cleveland 2, Ohio

THOMAS J. MACK
4506 West 42nd St.
Cleveland 9, Ohio

FRANK A. MARTIN
Staff Engr.
The Hoover Co.
North Canton, Ohio

WM. H. MARTIN
Owner
Magnetic Plastics Co.
1900 Euclid Ave.
Cleveland, Ohio

O. W. MARSH
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The General Industries Co.
Elyria, Ohio

ARTHUR H. MEYERS
Corrosion Eng.
Industrial Rayon Corp.
West 98th & Walford
Cleveland 1, Ohio

WILLIAM J. MISKELLA
President
The Miskella Infra-Red Co.
7301 Grand Ave.
Cleveland 4, Ohio

ROBERT L. MOORE
Plastic Technologist
Goodyear Tire & Rubber Co.
Martha & Goodyear Aves.
Akron, Ohio

G. A. MORRELL
Dist. Mgr.
Formica Insulation Co.
523 Caxton Bldg.
Cleveland 15, Ohio

ALFRED R. MORRIS
Office Mgr.
Lester-Phoenix Inc.
2711 Church Ave.
Cleveland 13, Ohio

A. REYNOLDS MORSE
Dist. Mgr.
Reed-Prentice Corp.
419 Penton Bldg.
Cleveland 13, Ohio

M. SCOTT MOULTON
Tech. Service Mgr.
B. F. Goodrich Chemical Co.
324 Rose Bldg.
Cleveland 15, Ohio

J. E. MULLER
Supt. of Molding
Plastics Eng. Inc.
8506 Lake Ave.
Cleveland 2, Ohio

HAROLD T. MURPHY
Brush Development Co.
3361 Perkins Ave.
Cleveland 14, Ohio

THOMAS F. MUSHRAVE
Elec. Sales Eng.
Anderson Bolds Inc.
1836 Euclid Ave., Rm. 418
Cleveland, Ohio

C. E. NEWMAN
Sales Repr.
Rane Tool Co.
Room 501—Western Res. Bldg.
1470 West 9th St.
Cleveland 13, Ohio

WM. HOWARD NICOL
Plastics Research Dept.
Goodyear Tire & Rubber Co.
Akron 16, Ohio

HARRY S. OLSON
Diamond Alkali Co.
Painesville, Ohio

JAMES E. ORR, JR.
Plastic Engrg. Inc.
8506 Lake Ave.
Cleveland 2, Ohio

THOMAS E. ORR
Vice-Pres., Sec. & Treas.
Plastic Engineering Inc.
8506 Lake Ave.
Cleveland 2, Ohio

EDWIN H. OSBORN
14922 Tokay Ave.
Bedford, Ohio

BUD W. PASNOW
Asst. Research Engr.
Pesco Products Co.
11610 Euclid Ave.
Cleveland, Ohio

WILLIS A. PATTON
Sales Engr.
Hydraulic Press Mfg. Co.
717 Hanna Bldg.
Cleveland 15, Ohio

WALTER S. PRENDERGAST
Plant Supt.
Carter Products Corp.
6921 Carnegie
Cleveland 3, Ohio

J. MORRIS PRICE
1570 Overlook Dr.
Milbrook
Greenwich, Conn.

WARREN V. PRINCE
President
Prince Industrial Plastics Corp.
8107 Grand Ave.
Cleveland, Ohio

STANLEY PRUSINSKI
Atlantic Plastics & Metal
Parts Co.
4732 St. Clair
Cleveland 4, Ohio

C. F. PRUTTON
Head, Dept. of Chem.
Case School of Applied
Science
10900 Euclid Ave.
Cleveland, Ohio

ARTHUR H. RADDE
Plant Mgr.
Vlchek Tool Co.
Box 158
Middlefield, Ohio

GEORGE H. REED
Field Engr.
American Hard Rubber Co.
Akron 9, Ohio

PAUL L. REED
Editor "Industrial Plastics"
Huebner Publications
2460 Fairmount Blvd.
Cleveland 6, Ohio

LEONARD WM. RETTBERG
Diemaker
Plastic Engineering Inc.
8506 Lake Ave.
Cleveland 2, Ohio

ROBERT H. RODGERS
20014 Scottsdale Blvd.
Shaker Heights 22, Ohio

GEORGE L. ROSENFELD
President
Atlantic Plastics
4732 St. Clair Ave.
Cleveland 3, Ohio

HERMAN T. ROY
Chief Chemist
Johnston & Jennings
877 Addison Rd.
Cleveland, Ohio

WINFRED PAUL RUPPRECHT
Editorial Asst.
Industrial Plastics
2460 Fairmount Blvd.
Cleveland 6, Ohio

DOUGLAS H. SANDERS
Engineer
Durite Plastics Inc.
18421 Lynnton Road
Shaker Heights 22, Ohio

OBERT H. SANDO
Sales Mgr. Co-Owner
Atlas Plastics Co.
3015 Woodhill Rd.
Cleveland 4, Ohio

CLIFFORD F. SAURWEIN
Research Engineer
Goodyear Tire & Rubber Co.
Akron, Ohio

CHARLES E. SCHLEYER
Industrial Engr.
Plastics Engineering Inc.
8506 Lake Ave.
Cleveland 2, Ohio

W. H. SCHWARTZ
Chief Engr.
Lester Eng. Co.
2711 Church Ave.
Cleveland, Ohio

CLEM D. SHAW
269 Avewda
Mira Beach
Sarasota, Fla.

L. S. SHAW
R I Box 152
Sarasota, Fla.

O. B. SHERMAN
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Sherman & Company
608 St. Clair, N.W.
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U. S. Stoneware Co.
Box 350
Akron, Ohio

EUGENE SLINGLUFF
Mgr. Reclaim Operations
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500 S. Main St.
Akron 18, Ohio

DAVID J. SLOANE
Lester Engineering Co.
2711 Church Ave.
Cleveland, Ohio

NOEL S. SODDERS
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Plastics Devel. Co.
1456 W-9th
Cleveland 13, Ohio

JOHN L. STAIR
Weatherhead Co.
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Case School of Applied
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Cleveland, Ohio

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B. F. Goodrich Co.
500 S. Main St.
Akron, Ohio

HAROLD TAYLOR
Plastics World
1503 Orchard Grove
Lakewood 7, Ohio

N. C. TAYLOR
Engr. & Service
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1604 Terminal Tower Bldg.
Cleveland, Ohio

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Hydraulic Press Mfg. Co.
717 Hanna Bldg.
Cleveland 15, Ohio

WILLIAM H. THOMAS, JR.
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DUANE THORNBURG
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Buckeye Mold & Die Co.
428 East Broad St.
Elyria, Ohio

MICHAEL L. THORNTON
Vice-President
Plastics Industries, Inc.
Kent, Ohio

R. B. TREER
Project Engineer
Warner & Swasey Co.
5701 Carnegie Ave.
Cleveland 3, Ohio

ELNO H. TRUMP
Chief Engineer
Plastic Engineering, Inc.
8506 Lake Avenue
Cleveland 2, Ohio

ALAN T. VALENTINE
Eng. Draftsman
Plastic Eng. Inc.
8506 Lake Ave.
Cleveland 2, Ohio

WARD T. VAN ORMAN
Plastic Testing
Goodyear Tire & Rubber Co.
Akron, Ohio

JOSEPH L. VARGA
Chief Draftsman
Lester Engineering Co.
2711 Church Ave.
Cleveland 13, Ohio

DAVID E. WAITE
Experimental Engr.
General Tire & Rubber Co.
Akron, Ohio

C. F. WATERFIELD
Production Engineer
Brush Development
3311 Perkins Ave.
Cleveland 14, Ohio

ROBERT B. WATERS
Tech. Representative
Bakelite Corp.
1501 Euclid Ave.
Cleveland, Ohio

PARKE H. WATKINS
Tech. Director
Eagle Rubber Co. Inc.
710 Orange St.
Ashland, Ohio

CLARENCE B. WEBB
Sales Representative
Auburn Button Works
22232 Byron Rd.
Cleveland 22, Ohio

DR. F. M. WHITACRE
Dir. of Scientific Rel.
Schieffelin & Co.
16-30 Cooper Sq.
New York City, N. Y.

DAVID WHITE
Secretary
Lester-Phoenix Inc.
2711 Church Ave.
Cleveland 13, Ohio

HAL R. WILLIAMS
Sales Engineer
American Insulator Corp.
1836 Euclid Ave.
Cleveland, Ohio

LLOYD H. WILLIAMS
Ohio Rubber Co.
Willoughby, Ohio

L. F. WILLMOTT
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Ball & Jewell
3701 Latimore Rd.
Shaker Heights, Ohio

HENRY M. WILSON
Mech. Engr.
The James Herron Co.
1360 West 3rd St.
Cleveland 13, Ohio

ORAN C. WILSON
President
Wilson Products Co.
7016 Euclid Ave.
Cleveland 3, Ohio

HUGH WINN
Inst. in Chem. Eng.
Case School of Applied Science
Cleveland 6, Ohio

ROBERT J. WRIGHT
Designer
Weatherhead Co.
300 East 131st St.
Cleveland 8, Ohio

THOMAS ZEELO
Plastics Mold & Die Co.
1965 E. 66th St.
Cleveland 3, Ohio

FRED C. ZIESENHEIM
Sales Mgr.
Lester Phoenix Inc.
2711 Church Ave.
Cleveland 13, Ohio

DETROIT SECTION

CLARK M. ADAMS
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1812 Center Ave.
Bay City, Michigan

C. H. ALLIN
Sales Eng.
General Indust. Co.
417 Curtis Bldg.
Detroit 2, Michigan

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Capac, Michigan

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Shift Supt.
Comm. Steel Treating Corp.
Detroit, Michigan

BARTO L. ATTIG
Sales Eng.
American Insulator Corp.
614 Stephenson Bldg.
Detroit 2, Michigan

EARL AUMANN
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6100 Tireman
Detroit, Michigan

LEE GRANT AXFORD
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8651 East 7 Mile Rd.
Detroit 12, Michigan

N. A. BACKSCHEIDER
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Appleton & B & O RR
Cincinnati, Ohio

MAURICE O. BARCHARD
Vice Pres.
General Industries Co.
Elyria, Ohio

B. J. BARNETT
Apartment 206
401 S. Cochrane
Los Angeles 36, Calif.

OTTO K. BECKER
President
Becker Mfg. Co.
21500 W. 8 Mile Rd.
Detroit 19, Michigan

R. CURTIS BEDELL
Chief Engineer
Michigan Molded Plastics
Dexter, Michigan

W. E. BIGGERS
Mgr.
Rohm & Haas Co.
619 Fisher Bldg.
Detroit 2, Michigan

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1983 E. 8 Mile Rd.
Hazel Park 3, Michigan

CLINTON W. BOLUNT
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W. H. BORDEN
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7310 Woodward Ave.
Detroit 2, Michigan

B. H. BOWLUS
Applied Plastics Div.
944 West 12th St.
Erie, Pa.

R. A. BOYER
Dir. of Scientific Res.
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5020 Spring Grove Ave.
Cincinnati 32, Ohio

WILLIAM BRADLEY
Detroit Macoid Corp.
12340 Cloverdale Ave.
Detroit 4, Michigan

R. R. BRADSHAW
Molding Engr.
Dow Chemical Co.
Midland, Michigan

H. L. BREITENSTEIN
318 Blvd. Bldg.
Detroit 2, Michigan

CHARLES A. BRESKIN
Editor & Publisher
Modern Plastics Mag.
122 E. 42nd St.
New York, N. Y.

HARRY R. BRETHEN
Mfg. Agent
11341 Woodward Ave.
Detroit, Michigan

SANFORD BROWN
Vice-Pres.
Bakelite Corp.
Suite 1130
30 East 42nd St.
New York 17, N. Y.

A. J. BRUEGGEN
Vice-Pres. & Compt.
American Brakeblok Div.
4600 Merritt Ave.
Detroit 9, Michigan

H. O. BUELTEMAN
Representative
Santay Corp.
7779 Cortland Ave.
Detroit 4, Michigan

ROLAND M. BUELTEMAN
Erie Resistor Corp.
11341 Woodward Ave.
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838 Maccabees Bldg.
Detroit 2, Michigan

ROBERT D. BURKHEAD
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Detroit 2, Michigan

GUY C. BURTON
Sales Eng.
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300 Bates St.
Detroit 26, Michigan

E. WILEY CLARK
Mgr. Plastics Div.
Keeler Brass Co.
Grand Rapids 2, Mich.

ARTHUR E. COLE
A. E. Cole Company
747 New Center Bldg.
Detroit 2, Michigan

FRED A. COLE
Repr.
Amos Molded Plastics
814 Fox Bldg.
Detroit 1, Mich.

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The Collins Indust.
Bryan, Ohio

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Owner
The F. Conley Co.
510 Stephenson Bldg.
Detroit 2, Michigan

JAMES M. CONNELLY
New Plastics Corp.
1016 N. Sycamore St.
Hollywood 36, Calif.

WILLIAM A. COOMBS III
Detroit Repr.
Mack Molding Co.
6432 Cass Ave.
Detroit 2, Michigan

GEORGE E. COSSIN
Prod. Designer
1432 Townsend
Detroit, Michigan

WILLIAM T. CRUSE
Exec. Vice-Pres.
Soc. of Plastics Indust.
295 Madison Ave.
New York 17, N. Y.

WARD F. CURLEY
Manager
Ward's Name Plates
116 E. Atwater St.
Detroit 26, Michigan

ANTHONY D'AGOSTINO
Engineer
Evans-Winter-Hebb Inc.
818 W. Hancock
Detroit, Michigan

ROBERT G. DAILEY
Sales Mgr. Plastics Div.
The Standard Prod. Co.
505 Blvd. Bldg.
Detroit 2, Michigan

LEGRAND DALY
Gen. Mgr.
Paramount Rubber Co.
10401 Northlawn Ave.
Detroit 4, Michigan

J. A. DAY
Vice-Pres.
Industrial Mach. Tool Co.
1024 West 7 Mile Rd.
Detroit, Michigan

LOUIS DEAK, JR.
Asst. Eng. & Mold Desgr.
Engrg. Specialties Corp.
3476 Gibson St.
Detroit, Michigan

G. W. DELANO
Owner
Delano Plastics & Engr. Co.
305 Stephenson Bldg.
Detroit 2, Michigan

JOSEPH T. DEMERS
Prod. Mgr.
Yardley Plastics Co.
142 Parsons Ave.
Columbus, Ohio

JOHN DIETRICH
Mgr.
Great Lakes Plastics Co.
456 E. Cady St.
Northville, Michigan

STUART D. DOUGLAS
Asst. Research Dir.
Carbide & Carbon Chem. Co.
South Charleston 3, W. Va.

ROBERT H. DYKEHOUSE
20 Andre St. S. W.
Grand Rapids, Michigan

GUSTAVUS J. ESSELEN
President
Gustavus J. Esselen, Inc.
857 Boylston St.
Boston 16, Mass.

MONTGOMERY FERAR
Partner
Sundberg-Ferar
3157 Guardian Bldg.
Detroit, Michigan

JOHN R. FINN
Plant Mgr.
Standard Prod. Co.
St. Clair, Michigan

HALSEY R. FISHER
Vice-Pres.
Plastics Analysts
13544 Woodward
Detroit 3, Michigan

JACK FRANK
President
Schwab & Frank, Inc.
2941 E. Warren Ave.
Detroit 7, Michigan

ALEXANDER FRASER
Comm. Steel Trtg. Co.
6100 Tireman
Detroit, Michigan

JOHN A. FRASER
Comm. Steel Trtg. Co.
6100 Tireman
Detroit, Michigan

A. W. FRITCHE
General Indust. Co.
Olive & Taylor
Elyria, Ohio

FRANK RAYMOND GARVEY
Project Engr.
Fisher Body
G. M. Research Bldg. B
Detroit 2, Michigan

EMIL R. GAZDIK
Tech. Repr.
Bakelite Corp.
807 Stephenson Bldg.
Detroit 2, Michigan

DORSEY M. GOAD
Plastic Prod. & Sales Co.
7335 12th St.
Blvd. Temple Bldg.
Detroit 6, Michigan

W. C. GOGGIN
Mgr.
The Dow Chemical Co.
Midland, Michigan

NEIL ELDRIDGE GORDON
Wayne University
Detroit, Michigan

FRED B. GOULAIT
Sec. & Treas.
Nu-Engineering Inc.
1515 Bonner Ave.
Ferndale 20, Michigan

JACK E. GOULD
Detroit Macoid Corp.
12340 Cloverdale Ave.
Detroit 4, Michigan

LEONARD J. GRANKE
Design Engr.
1367 Somerset Rd.
Grosse Pointe 30, Mich.

GEORGE K. GRAVES
Jones-Dabney Co.
Caniff & Grand Trunk
Detroit 11, Michigan

CHARLES M. GREENE
Prod. Mgr.
Standard Prod. Co.
St. Clair, Michigan

GEORGE C. GRESS
Plastics Counsellor
Lyon Inc.
13881 W. Chicago Blvd.
Detroit, Michigan

WARREN R. GROSS
President
W. R. Gross Co.
120 N. Ann Arbor St.
Saline, Michigan

PAUL C. HAAS
President
The Haas Corp.
Mendon, Michigan

HARRY C. HAAXMA
Chem. Eng.
Standard Products Co.
505 Blvd. Bldg.
Detroit 2, Michigan

EDGAR A. HAHN
Chem. Eng. & Metallurgist
Ainsworth Mfg. Corp.
2200 Franklin St.
Detroit 7, Michigan

FRED L. HAHN
Owner
Associate Eng. Co.
2608 Monterey
Detroit, Michigan

PAUL T. HAHN
Chief Eng.
General Armature & Mfg. Co.
1022 N. Main St.
Lock Haven, Pa.

JOHN R. HAINES
Owner
John R. Haines & Assoc.
2506 W. Broad St.
Columbus 4, Ohio

GAY P. HALL
Richardson Co.
6-252 Gen. Motors Bldg.
Detroit 2, Michigan

JAMES J. HALLEY
Research Dir.
Midwest Fiberglass Co.
2658 Porter St.
Detroit, Michigan

F. HALWARD
Gen. Mgr.
Quarnstrom Tool Co.
6698 E. McNichols Rd.
Detroit 12, Michigan

CHAS. F. HAMILTON
Sales Mgr.
Franklin Plastics Div.
Robinson Ind. Inc.
315 Grant St.
Franklin, Pa.

WILLIAM O. HANSEN
Apex Mfg. Industries
3516 Cadieux Rd.
Detroit 24, Michigan

H. R. HANSON
Tech. Director
Detroit Star Grinding
Wheel Co.
111 N. Cavalry
Detroit, Michigan

LAMINE F. HANSON
Tech. Repr.
Rogers Corp.
109 Mill St.
Manchester, Conn.

JAMES M. HART
Industrial Designer
3611 Huntington Blvd.
Fresno, Calif.

MARCO HECHT
President
General Prod. Corp.
Union Springs, N. Y.

ARLON C. HENDERSHOT
Chemical Engr.—Plastics
Ford Motor Company
Research Laboratory
Aircraft Bldg.
1127 Lincoln
Lincoln Park, Michigan

GEORGE S. HENDRIE
Vice-Pres. Sales & Eng.
Detroit Macoid Corp.
12340 Cloverdale Ave.
Detroit 4, Michigan

FRED HENKEL
1080 West Maple
Birmingham, Michigan

VINCENT D. HERY
Research Engineer
American Tool Wks. Co.
310 Eggelston Ave.
Cincinnati, Ohio

CHARLES W. HESS
President
C. W. Hess Co.
1900 E. Jefferson Ave.
Detroit, Michigan

RALPH J. HOENSHEID
President
Comm. Steel Trtg. Corp.
6100 Tireman
Detroit 4, Michigan

W. B. HOEY
Exec. Secretary
Society of Plastics Eng.
Theatre Bldg.
Birmingham, Michigan

DON F. HOFFMAN
Product Eng.
Evans-Winter-Hebb, Inc.
818 Hancock West.
Detroit 1, Michigan

CARL E. HOLMES
President
Am. Plastics & Eng. Corp.
414 Curtis Bldg.
Detroit 2, Michigan

L. S. HOUSE
Detroit Repr.
Recto-Molded Prod. Inc.
3-167 G. M. Bldg.
Detroit, Michigan

JOHN C. HOUSTON
Engineer
Chrysler Corp.
Box 1919
Detroit 31, Michigan

RICHARD L. HUBER
Tech. Engr.
Hercules Powder
628 Fisher Bldg.
Detroit 2, Michigan

RALPH B. HUFFMAN
Division Mgr.
Dockson Corp.
3839 Wabash Ave.
Detroit 8, Michigan

ORSON HUGHES
Co-Owner
Paragon Plastics Co.
642 Beaubien St.
Detroit 26, Michigan

CHARLES K. HUNT
Use Research Lab. Ch.
Sharples Chemicals Inc.
P. O. Box 49
Wyandotte, Michigan

GEORGE F. HUNTZICKER
Asst. to President
Graham-Paige Inter. Corp.
Willow Run, Michigan

EDWARD L. JACOBSON
Foreman
Universal Button Co.
2250 W. Fort St.
Detroit 16, Michigan

E. H. JANES
Vice-Pres.
Asbestos Mfg. Co.
7-246 Gen. Motors Bldg.
Detroit, Michigan

HENRY W. G. JEND
Chief Eng.
Mich. Die Casting Co.
8651 East 7 Mile Rd.
Detroit 12, Michigan

PAUL M. JENSEN
Plastics Sales Div.
The Dow Chemical Co.
932 Fisher Bldg.
Detroit 2, Michigan

JOHN JOSEPH JIGA
Research Chem. Engr.
Micromatic Hone Corp.
8100 Schoolcraft
Detroit 4, Michigan

GEORGE A. JOHNS
President
American Insulator Corp.
New Freedom, Pa.

SAMUEL N. JONES
President
Jones-White Plastics Co.
403 W. Baltimore
Detroit 2, Michigan

JOS. J. KALLER
Auto-Body Draftsman
Packard Motor Car Co.
Detroit, Michigan

MARTIN J. KARLSTROM
Mold Desgr. & Mold Maker
Burroughs Add. Mach. Co.
6071 Second Ave.
Detroit, Michigan

RICHARD A. KAUMEYER
Research Director
Evans Products Co.
901 Washington Blvd.
Venice, Calif.

WM. HENRY KAUTZ
Shift Supt.
Commercial Steel Trtg. Corp.
6100 Tireman
Detroit, Michigan

PAUL L. KEACHIE
Sales Repr.
Shakespeare Products Co.
1014 Stephenson Bldg.
Detroit 2, Michigan

J. P. KELSO
Sales Mgr.
Bay Mfg. Div.
Electric Auto Lite Co.
723 New Center Bldg.
Detroit, Michigan

KARL W. KITHIL
Michigan Repr.
Celanese Plastics Corp.
610 Stephenson Bldg.
Detroit 2, Michigan

HARRY KLINE
Mgr. & Tech. Dir.
Reichhold Chemicals Inc.
601 Woodward Hts. Blvd.
Detroit 20, Michigan

EBERT KNAUER
Research Engr.
Burroughs Adding Mach. Co.
6701 Second Blvd.
Detroit 32, Michigan

E. R. KNOWLES
Sales Mgr.
Improved Paper Mach. Co.
14 Berkley St.
Nashua, N. H.

EVERETT G. KNOX
Sales Engr.
Ditzler Color Div.
8000 West Chicago Ave.
Detroit 4, Michigan

HARRY P. KOENNEKE
Chief Engr.
Engr. Specialties Corp.
3476 Gibson St.
Detroit 19, Michigan

JOHN A. KOONS
Gen. Mgr.
American Plastics Engr. Corp.
3020 E. Grand Blvd.
Detroit, Michigan

H. M. KORDENBROCK
Owner
Kordenbrock Machinery Co.
2832 E. Grand Blvd.
Detroit 11, Michigan

ANDREW F. KOVACS
Vice-President
General Mach. & Tool Wks.
40261 13 Mile Rd.
Walled Lake, Michigan

GEORGE J. KOVACS
President
General Mach. & Tool Wks.
40261 13 Mile Rd.
Walled Lake, Michigan

MILTON I. KUSHNIR
Sales Mgr.-Sec.
The Sperber Mfg. Co.
1815 Trombly
Detroit 11, Michigan

L. D. LAMB
Representative
Durite Plastics
6155 Yorkshire
Detroit 24, Mich.

H. B. LEINBACH, JR.
Sales
Celanese Plastic Corp.
610 Stephenson Bldg.
Detroit 2, Michigan

IRVING S. LERMER
Vice-Pres.—Sales
Celluplastic Corp.
50 Avenue L
Newark 5, N. J.

FRANK W. LESS
Service Engr.
Durez Plastics & Chem. Inc.
63 Woodcrest Blvd.
Kenmore 17, N. Y.

HAROLD A. LEVEY
Pres. & Dir. Engr.
American Prod. Mfg. Co.
8131 Oleander St.
New Orleans, La.

JAMES T. LIBBEY
Sales
Michigan Molded Plastics, Inc.
6432 Cass
Detroit 2, Michigan

R. H. LILLYBLAD
Partner
Camfield Mfg. Co.
Grand Haven, Michigan

GUNNAR LINDH
Mgr. Plastics Div.
The Udylite Corp.
1651 E. Grand Blvd.
Detroit 11, Michigan

PHILANDER S. LOOMIS
Owner
General Plastics Products
70 W. Palmer St.
Detroit 2, Michigan

STANLEY L. LUNDSTEN
Detroit Mgr.
Spaulding Fibre Co.
3540 West Fort St.
Detroit 16, Michigan

CLARENCE H. LUTHER
President
Hydraulic Equipment Co.
15218 E. Jefferson Ave.
Grosse Pointe 30, Mich.

WILLIAM B. LUTZ
Chemist
Fabricon Prod. Inc.
1721 Pleasant Ave.
River Rouge 18, Mich.

H. A. WILFRED LYNCH
Consultant
P. O. Box 2
St. Johns, Quebec, Canada

STUART MacDONALD
Gen. Mgr.
MacDonald Mfg. Co.
New Baltimore, Michigan

DAVID WILLIAM McARTHUR
Technical Sales
Reichhold Chemicals, Inc.
601 Woodward Heights
Detroit 20, Michigan

FREDERICK I. McCOSH
Mech. Engr.
Hydraulic Press Mfg. Co.
2842 W. Grand Blvd.
Detroit 2, Michigan

JAMES D. McDONALD
Owner
McDonald Mfg. Co.
544 E. 31st St.
Los Angeles 11, Calif.

HARRY J. McGOWAN, JR.
Dist. Mgr.
Bakelite Corp.
807 Stephenson Bldg.
Detroit 2, Michigan

LOUIS P. McGOWEN
Supt.
Ford Motor Co.
Dearborn, Michigan

T. CURTIS McKENZIE
Owner
Klem Chemical Works
14401 Lanson
Dearborn, Michigan

THOMAS CLARK MAHONEY
Vice-President
Midwest Mach. & Mfg. Co.
Muskegon, Michigan

M. M. MAKEEVER
President
Interlake Chemical Corp.
262 Washington St.
Boston, Mass.

VIOLA MAKEEVER
Consultant
Interlake Chemical Corp.
262 Washington St.
Boston, Mass.

FRANK D. MANLEY
Dist. Mgr.
The Formica Insulation Co.
1342 Book Bldg.
Detroit 26, Michigan

ANTHONY S. MARTA
Burroughs Adding Mach. Co.
6071 Second St.
Detroit, Michigan

HANS MAYER
Gen. Mgr.
Trenton Plastic & Metals Div.
Circle F. Mfg. Co.
20 Prince St.
Trenton, N. J.

HENRY G. MICHAEL
Mgr.
MacDonald Mfg. Co.
836 Bedford St.
New Baltimore, Michigan

JOHN A. MICKEY
Chem. Eng.
Ford Motor Co.
Detroit, Michigan

HERMAN E. MILLER
Imperial Corporation
309-10 Citizens Indust.
Bank Bldg.
Grand Rapids, Michigan

J. S. MILLER
Sales
Durez Plastics & Chem. Co.
503 Stephenson Bldg.
Detroit, Michigan

STUART P. MILLER
Technical Service
E. I. DuPont De Nemours & Co.
5-238 G. M. Bldg.
Detroit 2, Michigan

ARMAND MILLIER
Partner
Nu-Engineering Co.
1515 Bonner Ave.
Ferndale 20, Mich.

FREDERICK A. MONAHAN
Gen. Mgr.
Formold Industries
535 E. 10 Mile Rd.
Hazel Park, Michigan

EDWARD MOREY
Owner
Morey Photo Plastics
7408 Michigan Ave.
Detroit 10, Michigan

JAMES K. MORISEY
Dist. Repr.
Continental Can Co.
901 Stephenson Bldg.
Detroit 2, Michigan

JAMES E. MORRISON
Assoc. Eng.
Detroit Macoid Corp.
414 Curtis Bldg.
Detroit 2, Michigan

L. J. MORRISON
Sales Mgr.
Detroit Mold Eng. Co.
6686 E. McNichols Rd.
Detroit 12, Michigan

GRANVILLE A. MORSE
Mfgr. Repr.
427 Blvd. Bldg.
Detroit 2, Michigan

DAVID A. MUNNS
Asst. Div. Mgr.
Bakelite Corp.
30 E. 42nd St.
New York, N. Y.

BERNARD C. MURRAY
Tool Designer
Briggs Mfg. Co.
12026 E. Vernor
Detroit, Michigan

DR. RAYMOND NAUTH
Gen. Mgr.
Ray-Metal Co.
21341 W. McNichols Rd.
Detroit 19, Michigan

JOHN NEUMAN
President
Nu-Engineering Co.
1515 Bonner Ave.
Ferndale, Michigan

GEORGE F. NEUMAN
Treas.
Una-Craft Eng. Co.
1983 E. 8 Mile Rd.
Hazel Park 3, Michigan

FERRIS E. NEWMAN
Plastic Engineer
Briggs Mfg. Co.
11631 Mack Ave.
Detroit, Michigan

JANN P. NIELSEN
Supt.
Camfield Mfg. Co.
718 N. Seventh St.
Grand Haven, Mich.

A. C. NIXON
Engineer in Charge
Fisher Body Div. GMC
465 W. Milwaukee
Detroit 2, Michigan

T. WALTER NOBLE
Mgr. Plastics Div.
Fabricon Products, Inc.
1721 Pleasant Ave.
River Rouge 18, Mich.

FRANK W. NOFTZ
Indust. Designers
Frank W. Noftz Co.
6140 Neff Road
Detroit, Michigan

ROBERT D. NOYES
Sales Eng.
Bakelite Corp.
300 Madison Ave.
New York 17, N. Y.

ERIC OSTLUND
2211 Morris Ave.
Lincoln Park 25, Mich.

PAUL F. OSWALD
President
Oswald Eng. Serv. Inc.
504 Queen & Crescent Bldg.
New Orleans 12, La.

AMBROSE D. PAULL
Secretary
Wheeling Stamping Co.
21st & Water St.
Wheeling, W. Va.

ANTHONY J. PAWLAK
Prod. Control Analyst
Ford Motor Company
Dearborn, Michigan

LAMBERT M. PAYNE
President
L. M. Payne Co.
417 Curtis Bldg.
Detroit, Michigan

ROBERT D. PEEBLES
Waterbury Industries
19924 John R. St.
Detroit 3, Michigan

O. H. PELHAM
Engineer
Woodall Indust. Inc.
7565 E. McNichols Rd.
Detroit 5, Michigan

SILVIO A. PELLERANO
Consulting Chem. & Tech.
1918 71st St.
Brooklyn 4, N. Y.

MARK W. PETERS
Vice-Pres.
Nixon Nitration Works
Nixon, N. J.

K. G. PETERSON
Sales Eng.
Sheller Mfg. Corp.
So. Bridge St.
Portland, Ind.

W. M. PHILLIPS
Head-Electro Chem.
Rubber & Plastics Dept.
Gen. Motors Research Div.
Rm-11-104
Detroit 2, Michigan

RALPH O. PHILLIPS
Captain, USNR
Bureau of Ordnance
Navy Department
Washington 25, D. C.

R. F. PICKRELL
Mgr.
Industrial Plastics
314 Stephenson Bldg.
Detroit 2, Michigan

J. E. PIERCE
Planning Engr.
Dow Chemical Co.
Midland, Michigan

W. D. POTTER
Plastic Research Corp.
322 E. Maryland Ave.
Royal Oak, Michigan

VICTOR T. POWERS
Shift Supt.
Comm. Steel Trtg. Corp.
6100 Tireman Ave.
Detroit 4, Michigan

IVAR QUARNSTROM
President
Detroit Mold Eng. Co.
6698 E. McNichols Rd.
Detroit 12, Michigan

N. J. RAKAS
Project Eng.
Chrysler Corp.
12800 Oakland
Highland Park, Mich.

B. JOSEPH RATH
Mgr.
Center Line Products
28661 Van Dyke Ave.
Center Line, Mich.

KURT B. REINICKE
Hob Specialist
Woshyna Plastic Mold Co.
6151 Michigan
Detroit, Michigan

D. L. RHAESA
Tech. Repr.
Rohm & Haas Co.
619 Fisher Bldg.
Detroit, Michigan

PHIL F. ROBB
Mgr.
Hercules Powder Co., Inc.
628 Fisher Bldg.
Detroit 2, Mich.

JAMES JOS. RODAK
Senior Engr.
Ford Motor Co.
Dearborn, Michigan

J. S. RODGERS
Tech. Supervisor
Wolverine Tube Div.
1411 Central Ave.
Detroit, Michigan

DON ROGERS
President
Rogers Chemical Co.
9729 Conant Ave.
Detroit 12, Michigan

J. B. ROHRER
1575 Ovllette Ave.
Windsor, Ontario, Canada

R. W. ROSE
Sales
Yardley Plastics Co.
7-121 G. M. Bldg.
Detroit 2, Michigan

JOHN G. ROSSITER
Pres. & Gen. Mgr.
Mich. Molded Plast. Inc.
Dexter, Michigan

CHARLES A. SANFORD
Business Mgr.
Plastics Inst. & Plastics
Analysts, Inc.
13544 Woodward Ave.
Detroit 3, Michigan

FRANK F. SANFORD
Product Application
Celanese Plastic Corp.
610 Stephenson Bldg.
Detroit, Michigan

J. A. SARGENT
Dist. Mgr.
Plastic Mfgs., Inc.
805 New Center Bldg.
Detroit 2, Michigan

FRED E. SCHWAB
Vice-President
Schwab & Frank Inc.
2941 E. Warren Ave.
Detroit, Michigan

M. CLAYTON SCHWER
Dist. Mgr.
Despatch Oven Co.
2970 W. Grand Blvd.
Detroit 2, Michigan

R. J. SCOTHORN
Detroit Repr.
Consolidated Molded
Products Corp.
550 Maccabees Bldg.
Detroit 2, Michigan

PAUL W. SEILER
Sales Repr.
Santay Corp.
7779 Cortland Ave.
Detroit 4, Michigan

CHAS. W. SELHEIMER, JR.
Dir. of Training
U. S. Rubber Co.
6600 E. Jefferson
Detroit, Michigan

LAWRENCE W. SEYBOLD
Vice-Pres.—Treas.
Mich. Molded Plastics, Inc.
Dexter, Michigan

E. WHARTON SHAW
Development Eng.
Canadian Bridge Engr. Co.
Ojibway, Ontario, Canada

GILBERT SHAW
Bakelite Corp.
30 E. 42nd St.
New York 17, N. Y.

R. J. SHAW
Sales Repr.
Gits Molding Corp.
5-154 G. M. Bldg.
Detroit 2, Michigan

ROBERT M. SHRIVER
Night Supervisor
Quarnstrom Tool Co.
6698 E. McNichols
Detroit, Michigan

CARL E. SHULTZ
Foreman
Nu-Engineering Co.
1515 Bonner
Ferndale, Michigan

S. M. SILVERSTEIN
Vice-Pres. & Gen. Mgr.
The Rogers Corp.
218 Hartford Rd.
Manchester, Conn.

R. W. SINCLAIR
Capac Mfg. Co.
8-255 G. M. Bldg.
Detroit 2, Michigan

JOHN G. SLATER
Sales Repr.
Tennessee Eastman Repr.
904 Stephenson Bldg.
Detroit 2, Michigan

FRANK M. SMITH
Sales
Peerless Blue Print Co.
375 State St.
Detroit 26, Michigan

ROY A. SMITH
Yardley Plastics Co.
218 Lexington Bldg.
Detroit 2, Michigan

R. J. SOUTHWELL
Sales Engr.
Bakelite Corp.
807 Stephenson Bldg.
Detroit, Mich.

HERBERT S. SPENCER
Adv. Mgr.
Durez Plastics & Chem. Inc.
North Tonawanda, N. Y.

RAY E. SPOKES
Vice-Pres. & Tech. Dir.
American Brakeblok Div.
American Brake Shoe Co.
4600 Merritt Ave.
Detroit 9, Michigan

A. L. STAUFT
Western Sales Repr.
Wheeling Stamping Co.
410 Traction Bldg.
Cincinnati 2, Ohio

ALVIN N. STOMP
President
Una-Craft Eng. Co.
1983 E. 8 Mile Rd.
Hazel Park 3, Michigan

CARL W. SUNDBERG
Partner
Sundberg-Ferar
3157 Guardian Bldg.
Detroit, Michigan

WALLACE B. SWANK
Sales Engineer
Swank-Liddle Inc.
18925 Grand River
Detroit 23, Michigan

GORDON B. THAYER
Plastics Research Eng.
Dow Chemical Co.
Midland, Michigan

J. F. THOMPSON
Ex-Cell-O Corp.
1244 Oakman Blvd.
Detroit, Michigan

REIDER THORESON
Dist. Mgr.
Hydraulic Press Mfg. Co.
2842 W. Grand Blvd.
Detroit 2, Michigan

K. O. TOOKER
Mfg Eng.
Westinghouse Electric Corp.
Ardmore Blvd. Lab.
Forest Hills
Pittsburgh, Pa.

JOHN K. TOTTEN
Chem. Eng.
Ford Motor Co.
Dearborn, Michigan

RICHARD E. TRUESDELL
Plastics Eng.
Ford Motor Co.
Dearborn, Michigan

C. VAN DEVENTER III
President
National Plastics Inc.
P.O. Box 152
Knoxville, Tenn.

CHARLES O. VANDERSEE
Partner
Woshyna Plastic Mold Co.
6151 Michigan Ave.
Detroit 10, Michigan

WILLIS W. VAN WEY
Detroit Mgr.
Reichard-Coulston Inc.
8747 Brandt St.
Detroit 2, Michigan

J. E. VOGEL
719 Newport Dr.
Pittsburgh 16, Pa.

GEO. W. WALKER
Owner
George W. Walker Co.
513 New Center Bldg.
Detroit 2, Michigan

SCOTT H. M. WALKER
Chief Inspector
Michigan Molded Plastics, Inc.
Dexter, Michigan

W. R. WALSH
Sales Engineer
Monsanto Chemical Co.
427 Fisher Bldg.
Detroit 2, Michigan

VIRGIL H. WATSON
Foreman (Technical)
Udylite Corp.
17131 Filer Ave.
Detroit, Michigan

ALEXANDER S. WEBSTER
Mould Maker
Burroughs Adding Mach. Co.
6071 Second Blvd.
Detroit, Michigan

LAWRENCE B. WEYMOUTH
Supervisor—Plastics Lab.
Briggs Mfg. Co.
3100 Meldrum Ave.
Detroit, Michigan

CARL H. WHITLOCK
Branch Mgr. Plastics Div.
Monsanto Chemical Co.
427 Fisher Bldg.
Detroit, Michigan

I. H. WHITMAN
Asst. Mgr.
Mich. Molded Plastics, Inc.
Dexter, Michigan

ARTHUR V. WHITTINGTON
Assoc. Eng.
J. E. Morrison Co.
414 Curtis Bldg.
Detroit 2, Michigan

CHAS. T. WIEDMAN
Mich. Molded Plastics, Inc.
Dexter, Michigan

GEORGE T. WILDE
Utica Plastics Corp.
1006 Lafayette Bldg.
Detroit 26, Michigan

F. PERRY WILSON
Service Eng.
Bakelite Corp.
30 E. 42nd St.
New York 17, N. Y.

LAWRENCE H. WILSON
Associate
Geo. W. Walker Co.
513 New Center Bldg.
Detroit 2, Michigan

HARRY E. WOOD
Production Eng.
Ternstedt, Div. Fisher Body
6307 W. Fort St.
Detroit 9, Michigan

FRED WOSHYNA
Owner
Woshyna Plastic Mold Co.
6151 Michigan Ave.
Detroit 10, Michigan

PETER ZAMPOL
Design Research
G.M.C. Truck & Coach
South Blvd.
Pontiac 11, Michigan

FRED J. ZIMMERMAN
Foreman
Burroughs Adding Mach. Co.
6071 Second Ave.
Detroit 32, Michigan

JOHN C. ZOLA
Chemical Eng.
Allied Plastics Co.
6235 So. Manhattan Pl.
Los Angeles 44, Calif.

ANDREW ZYWOTKO
Research Chemist
Woodall Industries
7565 E. McNichols Rd.
Detroit, Michigan

INDIANAPOLIS SECTION

DALE AMOS
Gen. Mgr.
Amos Molded Plastics
Edinburg, Ind.

WM. S. ASPINALL
Representative
Mayfair Molded Prod. Corp.
6265 N. Chester Ave.
Indianapolis 44, Ind.

K. D. BATCHELDER
Sales Engineer
Amos Molded Plastics
807 W. Market St.
Crawfordsville, Ind.

W. S. BLANCHARD
Sales
Monsanto Chem. Co.
427 Fisher Bldg.
Detroit, Mich

R. B. BOWER
Plastics Eng.
Delco Remy
Anderson, Ind.

GEO. M. BROUGHTON
Sales Representative
Sherrill Research Corp.
108 E. 9th St.
Indianapolis 2, Ind.

WAYNE SHIELDS BURTON
Plastics Eng.
Delco-Remy Div., G.M.C.
Anderson, Ind.

MILO H. BUZZEE, JR.
General Mgr.
Sherrill Mfg. Corp.
25 Court St.
Peru, Ind.

CLAYTON L. CANTERBURY
Foreman
Delco-Remy Division, G.M.C.
2401 Columbus Ave.
Anderson, Ind.

LEWIS D. FRENCH
Williams Tool Co.
124 Kentucky Ave.
Indianapolis 4, Ind.

W. O. GEBHART
General Foreman
Delco-Remy Div., G.M.C.
Anderson, Ind.

ROBERT K. GIBBS
17 Washington Ave.
Evansville, Ind.

WALTER R. GILSDORF
Manager
Spaulding Fibre Co.
402 Peoples Trust Bldg.
Ft. Wayne, Ind.

ERVIN R. HECK
Engineer
Amos Molded Plastics
509 S. Kyle St.
Edinburg, Ind.

LEE C. HINDS
Sales
Santay Corp.
110 E. 9th St.
Indianapolis 2, Ind.

L. A. HOLLIDAY
Ind. Representative
Chicago Molded Prod. Corp.
36 S. Pennsylvania St.
Indianapolis 4, Ind.

R. W. HULL
V.-Pres. Engineering
Rex Mfg. Co., Inc.
Connersville, Ind.

J. C. KAZIMIER
Chief Eng. & Sales Mgr.
Amos Molded Prod.
509 S. Kyle St.
Edinburg, Ind.

WM. F. KEGLEY
Vice-President
Sidener & VanRiper Adv. Inc.
1142 N. Meridian
Indianapolis, Ind.

J. D. MERCER
Sales Rep.
C. H. Rodgers & Co.
123 E. Sixth St.
Cincinnati, Ohio

WILLIAM MILLER
Chem. Eng.
R.C.A. Victor Div.
310 LaSalle St.
Indianapolis 3, Ind.

ROBERT H. MOREHOUSE
Kent Plastics
1528 N. Fulton
Evansville 10, Ind.

O. H. OGDEN
Mold Design Eng.
Delco-Remy Div., G.M.
Anderson, Ind.

G. W. OUTCALT
Sales Eng.
P. O. Box 5911
Indianapolis 5, Ind.

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110 E. 9th St.
Indianapolis 2, Ind.

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Sales Rep.
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Indianapolis 2, Ind.

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Delco-Remy Div., G.M.C.
Anderson, Ind.

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Tool Div.
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Indianapolis 2, Ind.

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Indianapolis, Ind.

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Bedford, Ind.

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Rockwood Mfg. Co.
1801 English Ave.
P. O. Box 636
Indianapolis 5, Ind.

MIAMI VALLEY SECTION

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President
Adams Plastic Prod.
Box 926
Cincinnati 1, Ohio

J. E. BARRON
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J. E. Barron & Associates
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Cincinnati 2, Ohio

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Vice-President
Burton-Rodgers, Inc.
4527 Reading Rd.
Cincinnati 29, Ohio

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Dayton Branch Mgr.
Celanese Plastics Corp.
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Dayton 2, Ohio

J. W. BRIERLY
Bakelite Corp.
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Bloomfield, N. J.

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Plastics Eng.
Cincinnati Industries Inc.
Station Ave. & Big 4 R.R.
Cincinnati 15, Ohio

G. W. CARPENTER
Sales Engineer
Tennessee Eastman Corp.
305 Third Nat'l Bldg.
Dayton 2, Ohio

ROBERT G. CHOLLAR
Head Chemical Research
National Cash Register
S. Main & "K" St.
Dayton 9, Ohio

FRANK M. COOPER
15 Rose Blvd.
Akron 3, Ohio

C. W. CUSTENBORDER
Standard Molding Corp.
1517 E. 3rd
Dayton 4, Ohio

ROY H. DEAN
Kurz-Kasch, Inc.
Dayton 1, Ohio

W. E. ECKERT
Gen. Mgr.
Dimco Plastics
207 E. 6th St.
Dayton 2, Ohio

JOE FIEDLER
Partner
F. & F. Mold & Die Works
Box 35 Station "A"
Dayton 3, Ohio

JOHN FIEDLER
Partner
F. & F. Mold & Die Works
Box 35 Station "A"
Dayton 3, Ohio

REID G. FORDYCE
Group Leader
Monsanto Chemical Co.
Nicholas Rd.
Dayton, Ohio

R. K. FRYMAN
Tool Designer
Kurz-Kasch Inc.
324½ W. Fairview Ave.
Dayton 5, Ohio

NELSON R. HAAS
Foreman
Delco Products
329 E. 1st St.
Dayton 1, Ohio

WILLIAM A. HAMES
Lab. Tech. Res. & Dev.
Inland Mfg. Div. G.M.C.
2700 Inland Ave.
Dayton 1, Ohio

CARLOS HOLSCHER
Mgr. Plastic Div.
Drackett Prod. Co.
5020 Spring Grove Ave.
Cincinnati, Ohio

C. M. JENSEN
Plant Engineer
Kurz-Kasch Inc.
1421 S. Broadway
Dayton, Ohio

HENRY J. KASCH, JR.
Kurz-Kasch Inc.
1421 S. Broadway
Dayton 1, Ohio

MARTIN H. KASCH
Sales Engineer
Kurz-Kasch Inc.
1421 S. Broadway
Dayton 1, Ohio

M. V. KEMPER
Sales Engineer
Improved Paper Machry. Corp.
425 W. Second St.
Dayton 2, Ohio

EUGENE F. KLEINER
Sales-Service
The American Tool Works Co.
Pearl & Eggleston Ave.
Cincinnati 2, Ohio

C. H. KRUGER
Designer
National Cash Register Co.
So. Main & K Sts.
Dayton 9, Ohio

O. W. LEIBIGER, Ph.D.
President
O. W. Leibiger Research Laboratories, Inc.
Petersburg, New York

DAVID E. LUCID
Senior Compounder
Inland Mfg. Div. G.M.C.
2727 Inland Ave.
Dayton 1, Ohio

JOHN M. MACK
Sales Rep.
E. I. duPont de Nemours & Co, Inc.
1347 Amherst Place
Dayton, Ohio

STEPHEN D. MARCEY
Lab. Technician
National Cash Register Co.
Main & K Sts.
Dayton, Ohio

D. L. MEEKER
V.-Pres., Sales Mgr.
Standard Molding Corp.
P.O. Box No. 1020
Dayton 1, Ohio

EDWIN MIKE
Foreman
Kurz-Kasch Inc.
1421 S. Broadway
Dayton 1, Ohio

DONALD M. MILLHOLLAND
Sales Manager
W. K. Millholland Mach. Co.
1048 Fairfield Ave.
Indianapolis 5, Ind.

ROBERT D. MILTENBERGER
Production Mgr.
Kurz-Kasch Inc.
1421 S. Broadway
Dayton 1, Ohio

WALTER E. MOORE
Chief Engineer
Plastic Research Prod. Lab.
Box 103
Urbana, Ohio

A. PAUL MUNCHEL
Chief Engineer
Standard Molding Corp.
Box 1020
Dayton, Ohio

RICHARD E. MYERS
Engineer
Standard Molding Corp.
Box 1020
Dayton, Ohio

HOWARD K. NASON
Director of Dev.
Monsanto Chemical Co.
Nicholas Rd.
Dayton 7, Ohio

BYRON W. NELSON
Head Plastics Dev. Lab.
National Cash Register Co.
Main & K Sts.
Dayton, Ohio

WILLIAM F. OBLINGER
Mach. Designer
National Cash Register Co.
Main & K Sts.
Dayton 9, Ohio

WALTER F. OELMAN
V.-President
Standard Molding Corp.
1517 E. 3rd St.
Box 1020
Dayton 3, Ohio

ALFRED ORLOW
Supervisor
F. & F. Mold & Die Works
Box 35 Station "A"
Dayton 3, Ohio

GEORGE C. PARNELL
Toolmaker
Kurz-Kasch, Inc.
1421 S. Broadway
Dayton 1, Ohio

WELTON T. PARTRIDGE
19 Glen Rd.
Mountain Lake N. J.

F. RAY PATTERSON
Salesman
Owens-Corning Fiberglas Corp.
714 Dixie Terminal Bldg.
Cincinnati 2, Ohio

LEONARD J. RAWSON
Chief Engineer
Kurz-Kasch Inc.
1421 S. Broadway
Dayton, Ohio

JOHN L. RUSSELL
Research Chemist
National Cash Register Co.
Main & K Sts.
Dayton 9, Ohio

JAMES J. SCHERRER
Finishes Laboratory
National Cash Register Co.
Main & K Sts.
Dayton 9, Ohio

FRANK E. SCHNEIDER
Supvr. of Plastic Sec.
Inland Mfg. Div., G.M.C.
Inland Ave.
Dayton, Ohio

ROBERT T. SCHWARTZ
Materials Engineer
Air Material Command
Wright Field
Dayton, Ohio

THOMAS S. SCOTT
Supt. Molding
Kurz-Kasch Inc.
1421 S. Broadway
Dayton 1, Ohio

GEORGE A. SHROYER
Sales Eng.
Durez Plastics & Chemical Co.
503 Stephenson Bldg.
Detroit, Mich.

RUSSELL E. SMITH
Designer
Kurz-Kasch Inc.
1421 S. Broadway
Dayton 1, Ohio

HAROLD S. SPIRES
Kurz-Kasch Inc.
1421 S. Broadway
Dayton 1, Ohio

R. G. STIGLER
President & Treasurer
Standard Molding Corp.
Box 1030
Dayton, Ohio

BERNARD C. STUPP
Process Engineer
Delco Prod. Div. G.M.C.
329 E. First St.
Dayton 1, Ohio

ARTHUR A. VOLZ
Consultant
Box 982
Dayton 1, Ohio

GEORGE F. WAITE
Sales Rep.
F. & F. Mold & Die Co.
1217 E. Third St.
Dayton, Ohio

WESLEY A. WEAVER
General Mgr.
Adams Plastic Prod.
Box 926
Cincinnati 1, Ohio

G. J. WILSON
Research Chemist
National Cash Register
Main & K Sts.
Dayton, Ohio

D. M. YOST
Asst. Tech. Director
Sorg Paper Co.
Middleton, Ohio

MILWAUKEE SECTION

FRED BARBER
Ch. Chemist
Perfex Corp.
500 W. Oklahoma Ave.
Milwaukee 7, Wisc.

JOHN D. BRAUGHT
Asst. Gen. Mgr.
Eclipse Moulded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

W. R. CLARKE
Sales Repr.
Continental-Diamond Fibre Co.
828 N. Broadway
Milwaukee, Wisc.

FRANKLIN E. COPPOCK
Factory Mgr.
Plastic Veneering Inc.
3115 N. Weil St.
Milwaukee 12, Wisc.

CARL J. ECKENROD
Supt. Molding
Taylor Mfg. Co.
3056 W. Meinecke St.
Milwaukee, Wisc.

E. G. ENGMAN
President
Eclipse Moulded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

R. P. ENGMAN
Ch. Engineer
Eclipse Moulded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

ALLEN DEAN FOOTE
Purch. Agent-Elec. Div.
Allis Chalmers Mfg. Co.
22 Callos St.
Milwaukee, Wisc.

R. P. GEISLER
Asst. Sales Mgr.
Eclipse Moulded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

DR. HOWARD L. GERHART
Research Chemist
Pittsburgh Plate Glass Co.
235 E. Pittsburgh Ave.
Milwaukee, Wisc.

WALTER A. GOEDE
Mfg. Tool Engr.
Cutler Hammer Inc.
315 N. 12th St.
Milwaukee 1, Wisc.

RICHARD P. GRUENEWALD
Employment Mgr.
Eclipse Moulded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

MILTON W. HOGE
Service Mgr.
Eclipse Moulded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

A. E. HUTCHINSON
Dir. Prod. Eng.
Milwaukee Gas Specialty Co.
P.O. Box 461
Milwaukee 11, Wisc.

EDMUND A. JANICKI
Control Chemist
Cutler-Hammer Inc.
315 N. 12th St.
Milwaukee, Wisc.

HUGH KELLY
Ch. Prod. Engr.
Perfex Corp.
500 N. Oklahoma Ave.
Milwaukee, Wisc.

WALTER F. KERSEG
Engineer
Eclipse Moulded Plastics Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

EDWARD KLOTZ, JR.
Dir.—Prod. Design
Milwaukee Indust. Designers
744 N. 4th St.
Milwaukee 3, Wisc.

MARCUS A. KOZAN
Supt. Inj. Molding
Eclipse Moulded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

G. C. KROENING
Wisconsin Repr.
Taylor Fibre Co.
312 E. Wisconsin Ave.
Milwaukee 2, Wisc.

HENRY R. MARSHALL
Mgr.—Plastics Div.
Cutler-Hammer Inc.
12th St. & St. Paul Ave.
Milwaukee 1, Wisc.

PHILIP R. MARVIN
Dir.—Research & Dev.
Milwaukee Gas Specialty Co.
722 N. Jackson St.
P.O. Box 461
Milwaukee 1, Wisc.

GORDON F. MERZ
Cutler-Hammer Inc.
315 N. 12th St.
Milwaukee, Wisc.

EARL R. METZELFIELD
Tool Engr.
Eclipse Moulded Prod. Co.
P.O. Box 461
Milwaukee 1, Wisc.

ROGER L. MILLER
Repr.
National Vul. Fibre Co.
739 N. Broadway
Milwaukee 2, Wisc.

LeROY J. MURRAY
Mech. & Plastic Desg. Engr.
Taylor Mfg. Co.
3056 W. Meinecke Ave.
Milwaukee 10, Wisc.

JAMES NASH
Sales Engr.
Eclipse Moulded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

FRED H. NEWMAN
Cons. & Sales Engr.
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207 E. Mich. St.
Milwaukee 2, Wisc.

G. D. NICHOLS
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Indust. Plastics Corp.
435 N. 2nd St.
Milwaukee 3, Wisc.

JULIUS W. PALEN
Taylor Mfg. Co.
3056 W. Meinecke Ave.
Milwaukee 10, Wisc.

HARRY F. PECK
Sales Mgr.
Taylor Mfg. Co.
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Milwaukee 10, Wisc.

N. J. PENNING
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Racine, Wisc.

C. F. PRESTON
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Eclipse Moulded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

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Milwaukee, Wisc.

GEORGE S. REMIKER
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5150 N. 32nd St.
Milwaukee, Wisc.

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Branch Mgr.
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3329 W. Vliet St.
Milwaukee, Wisc.

STEPHEN SAXON
Tool Maker
Eclipse Moulded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

ARTHUR F. SCEPANSKI
Molding Tech. & Asst. Chem.
Cutler-Hammer Inc.
315 N. 12th St.
Milwaukee, Wisc.

CARL N. SCHOLZ
Eclipse Molded Prod. Co.
5150 N. 32nd St.
Milwaukee 9, Wisc.

E. K. SCHROETER
Owner
Presco Plastics
P.O. Box 875
Milwaukee, Wisc.

RAYMOND N. SELLON, JR.
Indust. Designer
Eclipse Moulded Prod. Co.
5150 N. 32nd St.
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Milwaukee 9, Wisc.

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424 E. Wells St.
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Eclipse Moulded Prod. Co.
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Milwaukee 2, Wisc.

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Design Engr.
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Milwaukee 1, Wisc.

ROLAND M. WATERS
Sales Engr.
Spaulding Fibre Co.
3329 W. Vliet St.
Milwaukee, Wisc.

D. P. WEDEL
Pittsburgh Plate Glass Co.
235 E. Pittsburgh Ave.
Milwaukee, Wisc.

A. N. WILLIAMS
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Eclipse Moulded Prod. Co.
5151 N. 32nd St.
Milwaukee 9, Wisc.

GERALD C. WINTERS,
Design Engr.
Milwaukee Gas Specialty
P.O. Box 461
Milwaukee, Wisc.

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Plant Mgr.
Taylor Mfg. Co.
Layard Ave.
Racine, Wisc.

NEWARK SECTION

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E. I. duPont de Nemours & Co.
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GEORGE B. BARON
Purchasing Dept.
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23-10 43rd Ave.
Long Island City, N. Y.

PAUL BEEL
Professional Eng.
Columbia Eng. Co.
113 Sussex Ave.
Newark 4, N. J.

JOHN W. BERTHOLD
Asst. Chief Eng.
American Insulator Corp.
New Freedom, Pa.

LEONARD E. BEST
Secretary
Rich. Best Pencil Co.
211 Mountain Ave.
Springfield, N. J.

JOSEPH L. BONANNO
Chief Eng.-Treas.
The Lionel Corp.
28 Sager Pl.
Irvington, N. J.

R. E. BRANNAN
Bakelite Corp.
30 E. 42nd St.
New York 17, N. Y.

ROBERT BRINKEMA
Dir. of Research
Egmont Arens
480 Lexington Ave.
New York, N. Y.

GORDON BROWN
Vice Pres.
Bakelite Corp.
30 E. 42nd St.
New York 17, N. Y.

CHARLES ED. CARLSON
Supt. of Plastics Div.
Marks Prod. Co., Inc.
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Brooklyn, N. Y.

BURTON E. CASH
Celanese Corp. of Am.
290 Ferry St.
Newark, N. J.

ARCHIE A. CHRISTIAN
Methods Engr.
Shaw Insulator Co.
160 Coit St.
Irvington, N. J.

C. WM. CLEWORTH
President
Cleworth Pblsh. Co., Inc.
551 Fifth Ave.
New York 17, N. Y.

E. K. CLIVER
Electrical Engr.
Celanese Plastics Corp.
180 Madison Ave.
New York 16, N. Y.

WALTER J. A. CONNOR
Vice Pres.
Chemaco Corp.
Berkeley Hghts., N. J.

R. A. COOPER
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Research Co.
68 William St.
New York 5, N. Y.

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Chattley, Mass.

ERNEST J. CSASZAR
Commercial Eng.
Shaw Insulator Co.
150 Coit St.
Irvington, N. J.

R. H. CUNNINGHAM
Sales Mgr. Plastics Div.
Bryant Electric Co.
1105 Railroad Ave.
Bridgeport, Conn.

JOHN E. CURRIER
Tech. Repr.
Bakelite Corp.
30 E. 42nd St.
New York 17, N. Y.

MILLARD DEMAREST
Dir. Tech. Service
Celanese Plastics Corp.
180 Madison Ave.
New York, N. Y.

J. H. DuBOIS
Executive Eng.
Shaw Insulator Co.
150 Coit St.
Irvington, N. J.

WM. J. DUNNICAN
Sales Engineer
Durite Plastics Inc.
352 Plymouth Rd.
Union, N. J.

FRANK H. FAYCIK
R.F.D. No. 5, Box 425
New Brunswick, N. J.

FRED H. FELLOWS
Sales Engr.
Spaulding Fibre Co.
965 Broad St.
Newark 2, N. J.

HAROLD L. FLYNN
Assoc. Editor
American Machinist
330 W. 42nd St.
New York, N. Y.

EUGENE L. FORTNEY
Fortney Mfg. Co.
247 N. J. R. R. Ave.
Newark, N. J.

LOYD E. FORTNEY
President
Fortney Mfg. Co.
247 N. J. R. R. Ave.
Newark, N. J.

LOUIS J. FRANCISCO
Dist. Mgr.
Formica Insulation Co.
101 Park Ave.
New York 17, N. Y.

C. J. FROSCH
Tech. Staff
Bell Telephone Labs. Inc.
Murray Hill, N. J.

HAROLD E. FRUTCHEY
Plastic Engineer
Plastic Part Dev. Corp.
10 Lawrence St.
Newark, N. J.

DAVID H. GARRISON, JR.
Ch. Eng.
Industrial Synthetics Corp.
60 Woolsey St.
Irvington, N. J.

ROBERT M. GERLACH
Tool Maker
Newark Die Co.
24 Scott St.
Newark, N. J.

HERMAN GERING
Secretary
Gering Prod. Inc.
7th St. & Monroe Ave.
Kenilworth, N. J.

LARRY GERING
President
Gering Prod. Inc.
7th St. & Monroe Ave.
Kenilworth, N. J.

M. R. GEROW
Tech. Sales Eng.
Hercules Powder Co.
500 Fifth Ave.
New York 18, N. Y.

WILLIAM GIESE
Superintendent
Berkeley Eng. & Mfg. Co.
Berkeley Hghts, N. J.

EDWARD V. GLUCK
Prod. Mgr.
A. W. Franklin Mfg. Corp.
508 4th St.
Hoboken, N. J.

EVERETT R. GORDON
Dir. of Research
Gering Prod. Inc.
7th St. & Monroe Ave.
Kenilworth, N. J.

JAMES T. GROWLEY
Salesman
Celanese Plastics Corp.
180 Madison Ave.
New York 16, N. Y.

W. W. GRYCE
Modern Plastics Eng. Co.
16 Lewis Dr.
Maplewood, N. J.

SAM GURLEY, JR.
Sales-Mold. Compounds
Durez Plastics & Chem. Inc.
250 Park Ave.
New York 17, N. Y.

THEODORE A. HACKER
Sales Eng.
Radio Receptor Co.
251 W. 19th St.
New York, N. Y.

FRED HALES
Secy.-Treas.
Superior Plastics Corp.
134-25 Northern Blvd.
Flushing, L. I., N. Y.

KENNETH C. HALLIDAY, JR.
Plas. & Rubber Eng.
Eclipse-Pioneer Div.
Bendix Aviation Corp.
Teterboro, N. J.

B. F. HANTZ
Chief Engineer
American Insulator Corp.
New Freedom, Pa.

HENRY W. HARDING
President
Chemaco Corp. & Mfg. Chemical Corp.
Snyder Ave.
Berkeley Hghts., N. J.

RALPH F. HAYES
Chemist
Gering Prod., Inc.
7th St. & Monroe Ave.
Kenilworth, N. J.

EMILE HEMMING
Prod. Mgr.
Plastic Prod. Inc.
Pine St.
S. Norwalk, Conn.

JOHN HOHL
President
Newark Die Co., Inc.
24 Scott St.
Newark 2, N. J.

WALTER C. HYDE
Newark Mgr.
Spaulding Fibre Co., Inc.
965 Broad St.
Newark, N. J.

W. W. JACKSON
Dir. Prod. Appl.
Celanese Plastics Corp.
180 Madison Ave.
New York, N. Y.

KARL M. JOEHNCK
Vice President
Mfgs. Chem. Corp.
Berkeley Hghts., N. J.

WILLARD J. JOHNSON
President
Modern Plastic Mach. Corp.
55 W. 42nd St.
New York 18, N. Y.

BASIL J. KANE
Tech. Supervisor
Am. Hard Rubber Co.
Butler, N. J.

ALBERT A. KAUFMAN
Vice President
Ind. Synthetics Corp.
60 Woolsey St.
Irvington, N. J.

S. LEON KAYE
Superintendent
Universal Plas. Corp.
235 Jersey Ave.
New Brunswick, N. J.

CHARLES E. KAZIMIR
Chief Engineer
Muller Plas. Inc.
824 Livingston St.
Elizabeth, N. J.

E. F. KEUSCH
Tool & Prod. Eng.
Boonton Molding Co.
Boonton, N. J.

RONALD KINNEAR
President
Nia. Insul Bake Spec. Co., Inc.
483 Delaware Ave.
Albany, N. Y.

R. A. KOEGL
Partner
R. A. Koegl Stamp & Die Works
480 Wash. St.
Newark, N. J.

MAX G. HOLMES
Apparatus Eng.
Fed. Tele. & Radio Corp.
591 Broad St.
Newark, N. J.

PASCAL A. LaGRUTTA
Plant Supt.
Lapin Prod. Inc.
136 Tichenor St.
Newark, N. J.

FREDERICK LAMY
Chemist
Gering Prod. Inc.
7th St. & Monroe Ave.
Kenilworth, N. J.

ALFRED W. LAUCK
Sales Engineer
E. I. duPont deNemours & Co., Inc.
626 Schuyler Ave.
Arlington, N. J.

CHARLES S. LAWRENCE
Vice Pres. Sales & Dev.
Am. Plastics Corp.
225 W. 34th St.
New York 1, N. Y.

WILLIAM M. LESTER
President
Pyro Plastics Corp.
526 N. Ave. East
Westfield, N. J.

WILLIAM LEWI
Vice President-Eng.
Dusal Tool & Mold Co., Inc.
241 Centre St.
New York 13, N. Y.

J. W. LINDAU, III
President
South. Plas. Co., Inc.
911 Huger St.
Columbia 8, S. Carolina

ROBERT LINZER
Mgr. Res. & Dev.
Nixon Nitration Works
Nixon, N. J.

JOHN P. LOMBARDI
Molding Supt.
Shaw Insulator Co.
150 Coit St.
Irvington, N. J.

L. CHESTER LORDLY
Mgr. Mold. Dept.
Fed. Tele. & Radio Corp.
250 South St.
Newark 5, N. J.

MAURICE L. MACHT
Tech. Service
E. I. duPont deNemours & Co., Inc.
626 Schuyler Ave.
Arlington, N. J.

KENNETH MACKSEY
Mack Mfg. Co.
222 Watchung Ave.
Montclair, N. Y.

RICHARD F. MACKESSY
Plaskon Div.
Libby-Owens-Ford Glass Co.
41 E. 42nd St.
New York, N. Y.

ELY S. MARGOLIS
Plastic-Ware, Inc.
258 William St.
New York 7, N. Y.

R. E. MARTIN
Sales Eng.
Bowen Eng. Inc.
Box 156
Garwood, N. J.

JOHN L. MAUER
Plastic Insulator Co.
11 Rock Ave.
Plainfield, N. J.

R. J. METZLER
Prod. Supervisor
Cellulose Prod. Dept.
Hercules Powder Co.
900 Market St.
Wilmington 99, Del.

EDWARD C. MILLER
Vice President
Industrial Chem. Co.
Lenoir, N. Carolina

JOHN MILO
Partner
Jersey Mfg. Co.
401 Livingston St.
Elizabeth, N. J.

JOSEPH P. MORAN
Tech. Sales Eng.
Airtronics Mfg. Co.
31-28 Queens Blvd.
Long Island, N. Y.

ROYAL H. MURRAY
Supervisor
Weston Elec. Inst. Corp.
614 Freilinghuysen Ave.
Newark, N. J.

ANTHONY NATURALE
Eng. Dept. Supvr.
Thomas Mfg. Corp.
80 Clinton St.
Newark, N. J.

J. F. NICHOLL
Engineer
Lumite Div.
Chicopee Mfg. Corp. of Ga.
47 Worth St.
New York 13, N. Y.

ALFONSO J. NICORVO
Mold Designer
Essex Eng. Service Co.
161 Codwise Ave.
New Brunswick, N. J.
Tech. Rep.

ARTHUR NUFER
Tech. Rep.
Bakelite Corp.
30 E. 42nd St.
New York 17, N. Y.

JOSEPH A. OGANDO, JR.
Partner
Plastic Mold Tool & Die Co.
1 Maple St.
E. Rutherford, N. J.

ROBERT D. ORDE
Plastic Eng.
American Insulator Corp.
405 Lex Ave.
New York, N. Y.

ANTON J. PALME
Partner
Fidelity Tool Co.
21 S. Essex Ave.
Orange, N. J.

EDWIN F. PALMER
Plastics Eng.
Shaw Insulator Co.
150 Coit St.
Irvington 11, N. J.

SPENCER E. PALMER
Sales Mgr. Cellulose Plastics Div.
Tennessee Eastman Corp.
Kingsport, Tenn.

GILBERT L. PEAKES
Bakelite Corp.
Bound Brook, N. J.

RICHARD O. A. PETERSEN
Works Mgr.
Syracuse Ornamental Co., Inc.
581 So. Clinton St.
Syracuse 2, N. Y.

MARIO J. PETRETTI
Gen. Mgr.
Noma Electric Corp.
Plastics Division
178 Sargeant St.
Holyoke, Mass.

STEVEN A. PETRETTI
Plastic Supervisor
Eagle Electric Corp.
23-16 S. Bridge Plaza
Long Island, N. Y.

D. S. PLUME
Mgr. Molding Powder Sales
Rohm & Haas
11 West 42nd St.
New York, N. Y.

LOUIS J. QUITONI
Superintendent
Bestway Prod. Inc.
142 Central Ave.
Clarkstownship, N. J.

LOUIS F. RAHM
Chairman-Plastics
Princeton University
Princeton, N. J.

WALTER E. RAHM
Plastics Tech.
E. I. duPont deNemours & Co.
626 Schuyler Ave.
Arlington, N. J.

EDWIN P. REESE
220-30 Hartland Ave.
Queens Village, N. Y.

GEORGE W. RHINE
Managing Editor
Cleworth Pblsh. Co.
551 Fifth Ave.
New York 17, N. Y.

WAYNE F. ROBB
Research Engineer
Shaw Insulator Co.
150 Coit St.
Irvington, N. J.

C. THOMAS ST. JAMES
Designer
Modern Plastics Engr. Co.
16 Lewis Drive
Maplewood, N. J.

JACK SANDLER
Vice President
Hungerford Plastics Corp.
Central Ave. & South St.
Murray Hill, N. J.

LAWRENCE C. SANTISI
Universal Plastics Corp.
New Brunswick, N. J.

JOHN SASSO
Managing Editor, Product Engineering
McGraw-Hill Pblsh. Co.
330 W. 42nd St.
New York 18, N. Y.

THEODORE SAULINO, JR.
Mold Designer
Shaw Insulator Co.
150 Coit St.
Irvington 11, N. J.

S. F. SCAVUZZO
1 Bronxville Road
Bronxville, N. Y.

WILLIAM SCHACK
Field Editor
Plastics Magazine
350 Fifth Ave.
New York 1, N. Y.

THEO. W. SCHEIDT
Chief Chemist
Consolidated Cork Corp.
4012 Second Ave.
Brooklyn, N. Y.

GORDON SCHMELTER
Nixon Nitration Works
Nixon, N. J.

PAUL SCHMEY
Tech. Sales Serv.
Celanese Corp.
Newark, N. J.

EDWARD SCHMIDT
T.R. Foreman
Shaw Insulator Co.
150 Coit St.
Irvington 11, N. J.

ALEXANDER S. SCHNEIDER
Prod. Mgr.
E. B. Kingsman Co.
96 Exchange St.
Leominster, Mass.

WAYNE M. SCHRAG
Chemist
Gering Prod. Inc.
7th St. & Monroe Ave.
Kenilworth, N. J.

JACOB SCHUFF
Plastics Engr.
Federal Tel. & Radio Corp.
100 Kingsland Road
Clifton, N. J.

GEORGE K. SCRIBNER
President
Boonton Molding Co.
326 Myrtle Ave.
Boonton, N. J.

ROBERT C. SCULL
Industrial Designer
Martial & Scull
1 East 53rd Ave.
New York 22, N. Y.

FRANK H. SHAW
President
Shaw Insulator Co.
150 Coit St.
Irvington, N. J.

MILTON S. SHEFTE
Chief Chemist
Gering Prod. Inc.
7th St. & Monroe Ave.
Kenilworth, N. J.

OBER C. SLOTTERBECK
New Prod. Dev.
Standard Oil Co. of N. J.
26 Broadway
New York 4, N. Y.

ALLEN B. SMITH
End Use Eng.
Turner Halsey Co.
40 Worth St.
New York, N. Y.

S. J. SMITH
Mgr. Plastics Sales
American Hard Rubber Co.
11 Mercer St.
New York 13, N. Y.

ROY A. SORENSON
Chemist
Nixon Nitration Works
Nixon, N. J.

EDWARD B. SOULES
Sales Engineer
Detroit Mold Engr. Co.
207 S. Springeld Ave.
Springfield, N. J.

LAZARUS SPIWAK
Res. & Dev. Engineer
Mycalex Corp. of Am.
60 Clifton Blvd.
Clifton, N. J.

CHARLES E. STAFF
Res. Dept.
Bakelite Corp.
230 Grove St.
Bloomfield, N. J.

FRED B. STANLEY
Engineering Editor
Modern Plastics
122 E. 42nd St.
New York 17, N. Y.

GEORGE A. STRAEISGUTH
Extrusion Engineer
Gering Products, Inc.
7th St. & Monroe Ave.
Kenilworth, N. J.

T. SMITH TAYLOR
Dir. of Research
United States Testing Co.
1415 Park Ave.
Hoboken, N. J.

ALEX F. TELYCHKA
Mold Designer
Shaw Insulator Co.
160 Coit St.
Irvington 11, N. J.

ANTHONY TERPAK
Owner
Modern Plastics Engr. Co.
16 Lewis Drive
Maplewood, N. J.

ISLYN THOMAS
President
Thomas Mfg. Corp.
80 Clinton St.
Newark, N. J.

KENNITH V. TINDALL
Sales Manager
Airtronics Mfg. Co.
31-28 Queens Blvd.
Long Island City, N. Y.

ALBERT A. TOTH, JR.
President
Muller Plastics Inc.
824 Livingston St.
Elizabeth, N. J.

ORVILLE A. TYLER
President
O. A. Tyler & Co. Inc.
382 Springfield Ave.
Summit, N. J.

HUGH VEZZOSI
Plant Supt.
Jersey Plastic & Die Cast. Co.
74 Richmond St.
Newark, N. J.

ARTHUR J. WARNER
Tech. Dir.
Federal Tel. & Radio Corp.
250 South St.
P.O. Box 832
Newark 2, N. J.

LEONARD W. WEISS
General Manager
Industrial Conversions, Inc.
101 Park Ave.
New York, N. Y.

L. E. WELCH
Plastics Engineer
14 N. Harrison St.
East Orange, N. J.

W. BURDETTE WILKINS
Consulting Engineer
245 E. Ridgewood Ave.
Ridgewood, N. J.

SIMON WILLIAMS
Assoc. Dir. of Research
Fabric Research Lab. Inc.
665 Boylston St.
Boston 16, Mass.

A. J. J. A. WILSON
Partner
Multi-Products Tool Co.
123 Sussex Ave.
Newark 4, N. J.

LAURENCE JOEL WINIK
General Manager
Royal Plastics Ltd.
26 Grove St.
New York, N. Y.

F. GORDON WINSLOW
Product Engineer
American Hard Rubber Co.
Butler, N. J.

C. A. WOELLERT
Tech. Service
Amercian Cyanamid Co.
30 Rockefeller Plaza
New York 20, N. Y.

PATRICK B. ZAZZARA
Gen. Manager
Jersey Plastic & Die Cstg. Co.
74 Richmond St.
Newark 3, N. J.

H. B. ZEIGER
Ch. Engineer
Plastic Insulator Co.
369 Lextington Ave.
New York 17, N. Y.

N. W. PENNSYLVANIA SECTION

R. C. ASMUS
Partner
J. A. Ferguson Co.
3952 W. 12th St.
Erie, Pa.

STANLEY BERG
Manager
Stanley Berg & Co.
Frick Bldg.
Pittsburgh, Pa.

W. O. BRETSCHNEIDER
Supt.
Erie Resistor Corp.
644 West 12th St.
Erie, Pa.

DON J. BUSCH
Process Engr.
Erie Resistor Corp.
530 W. 12th St.
Erie, Pa.

A. L. CHAPMAN
Mgr. Weld & Wire Prod. Div.
Sylvania Electric Prod. Inc.
208 East St.
Warren, Pa.

HAROLD S. CLOYD
Chief Engr.
Nosco Plastics
1617 Cascade St.
Erie, Pa.

WILLIAM C. CONROY
Asst. Sales Mgr.
Erie Resistor Corp.
530 West 12th St.
Erie, Pa.

PAUL D. DERBY
Draftsman
Bliley Electric Co.
Union Station
Erie, Pa.

DIXON P. DOWNEY
Ch. Standards Dept.
Franklin Plastics Div.
Robinson Industries
315 Grant St.
Franklin, Pa.

JOHN A. FERGUSON
Partner
J. A. Ferguson Co.
3952 West 12th St.
Erie, Pa.

J. REED GRAVES
Tool Room Foreman
Bliley Mfg.
412 West 12th St.
Erie, Pa.

O. V. JOHNSON
Owner
Johnson Die & Tool Co.
1008 Shenk Ave.
Erie, Pa.

ROBERT A. KLING
Ch. Mech. Engr.
Erie Resistor Corp.
644 W. 12th St.
Erie, Pa.

FRED J. KRAFT
Chief Engr.
Franklin Plastics Div.
Robinson Industries
315 Grant St.
Franklin, Pa.

CHARLES W. KUFNER
Plant & Prod. Supt.
Nosco Plastics
1617 Cascade St.
Erie, Pa.

ROBERT E. MANLEY
Purchasing Agent
Franklin Plastics Div.
Grant Street
Franklin, Pa.

LLOYD T. MOORE
Manager
Applied Plastics Div.
Keystone Brass Wks.
1102 W. 12th St.
Erie, Pa.

JAMES P. MURPHY
Process Engr.
Erie Resistor Corp.
530 West 12th St.
Erie, Pa.

STUART J. MYERS
Treas.
Warren Plastics Corp.
Warren, Pa.

WALTER C. OGE
Owner
Oge Tool Co.
1109 East 28th St.
Erie, Pa.

EDWIN J. OLOWINSKI
Draftsman
Nosco Plastics
17th & Cascade St.
Erie, Pa.

WILLIAM J. PHILLIPS
President
Presque Isle Plastics, Inc.
2730 West 12th St.
Erie, Pa.

NATHANIEL R. REYBURN
Ch. Engr.
Applied Plastics Div.
Keystone Brass Works
1102 W. 12th St.
Erie, Pa.

EDWARD H. ROBERTS
Design Engineer
General Electric
2901 E. Lake Road
Erie, Pa.

PAUL C. ROCHE
Sales Engr.
Nosco Plastics
Box 269
Erie, Pa.

BRUNO C. ROEHRL
Ch. Plant Engr.
Nosco Plastics
17th & Cascade St.
Erie, Pa.

IRA ROSIN
Consulting Chem. Engr.
Union Iron Works
15th & Cascade
Erie, Pa.

KENNETH A. ROUZER
Vice Pres. Mgr.
Presque Isle Plastics, Inc.
2730 W. 12th St.
Erie, Pa.

JOHN R. SCHUMACHER
Production Engr.
Bliley Mfg. Corp.
421 W. 12th St.
Erie, Pa.

CHARLES R. STURTEVANT
Electric Insulation Engr.
General Electric Co.
Erie, Pa.

FRED WACHTER
Engineer
National Erie Corp.
Rasberry St.
Erie, Pa.

RICHARD S. WAGNER
Draftsman
Nosco Plastics
Box 269
Erie, Pa.

RICHARD W. WELCH
Process Engr.
Continental Rubber Wks.
19th & Liberty St.
Erie, Pa.

JOHN J. WILLIAMS
Gen. Supt. Plant No. 7
Talon, Inc.
Meadville, Pa.

PHILADELPHIA SECTION

GERARD A. ALBERT
Sales & Dev. Engineer
National Vul. Fibre Co.
Wilmington 99, Delaware

T. BAYARD BALDRIDGE
District Sales Mgr.
National Vul. Fibre Co.
1718 Girard Trust Bldg.
Philadelphia 2, Pa.

J. W. BARNETT
Box 347
Hapeville, Ga.

J. G. BEASTEN
Sales
National Vul. Fibre Co.
1718 Girard Trust Bldg.
Philadelphia 2, Pa.

RAY V. BESHGETOOR
Mgr. Plastics Dept.
R.C.A. Victor Div.
Camden, N. J.

RICHARD BERNARD BISHOP
Research Chemist
Socony Vac. Oil Co. Inc.
Paulsboro, N. J.

WILLIAM O. BRACKEN
Plastics Marketing
Hercules Powder Co.
Market St.
Wilmington, Del.

JOHN BOKEENO
Plastics Eng.
R.C.A. Victor
Camden, N. J.

L. F. BORNSTEIN
Technical Director
Synvar Corp.
P.O. Box 1768
Wilmington 99, Del.

JOHN F. CARSON
Salesman
Frank J. Lunney Mach. Co.
17th & Cambria Sts.
Philadelphia, Pa.

JOHN B. CUTLER
Ch. Eng. Hyd. Div.
Wm. Sellers & Co., Inc.
16th & Hamilton St.
Philadelphia 30, Pa.

G. B. CULBERTSON
Manager
Allied Barrel Sales Corp.
265 W. Berks St.
Philadelphia 22, Pa.

RICHMOND CUNNINGHAM
Partner
Echo Machine Works
Sarah & Wildey Sts.
Philadelphia 25, Pa.

WILLIAM I. DENTON
Senior Chemist
Socony Vacuum Oil Co.
Paulsboro, N. J.

PHILIP A. DERHAM
President
Philip A. Derham & Assoc.
5 Seville Bldg.
Bryn Mawr, Pa.

D. D. DUNDORE
Engr. Mgr.
Adv. Novelty Mfg. Co.
325 N. 13th St.
Philadelphia, Pa.

GEORGE ELMENDORF
Purchasing Agent
General Electric Co.
6901 Elmwood Ave.
Philadelphia 42, Pa.

RICHARD J. EPPLE
Asst. Engr.—Spinning Div.
American Viscose Corp.
35 S. 9th St.
Philadelphia 7, Pa.

RICHARD L. FOOTE
Application Engr.
Synthane Corp.
Oaks, Penna.

JACK R. FREED
Laboratory Supervisor
Continental-Diamond-Fibre Co.
Bridgeport, Pa.

BENJAMIN FOX
General Mgr.
Hugh H. Eby, Inc.
4700 Stenton Ave.
Philadelphia 44, Pa.

C. W. GAYLER
Research Chemist
American Viscose Corp.
Marcus Hook, Pa.

GRAEFF W. GLENN
Sales Engineer
Bachmann Bros., Inc.
1400 E. Erie Ave.
Philadelphia 24, Pa.

EDWIN M. GOLDSMITH, JR.
Owner
Wynn Mfg. Co.
7th & Green Sts.
Philadelphia 23, Pa.

J. C. GRAF
Sales Mgr.
Wm. Sellers & Co., Inc.
1600 Hamilton St.
Philadelphia 30, Pa.

EDMUND GREENE
Prod. Dev. & Sales Prom. Mgr.
Rohm & Haas Co.
Washington Square
Philadelphia 5, Pa.

HUGH D. HALEY
Division Engineer
American Viscose Corp.
35 S. Ninth St.
Philadelphia, Pa.

JOSEPH M. HERBERT
Sales Engineer
Bakelite Corp.
30 E. 42
New York, N. Y.

E. J. HIGGINS
Sales Manager
Lance Mfg. Co.
5th & Cortland Sts.
Philadelphia 40, Pa.

JAMES R. HILTNER
Plastics Development
Rohm & Haas Co.
Bristol, Pa.

BERNARD JAFFE
Dev. Engr.
Panelyte Div.
St. Regis Paper Co.
Trenton, N. J.

EDMUND J. KABAKJIAN
Manager
Atlas Cleaners & Dyers
6101 Larchwood Ave.
Philadelphia, Pa.

THEO. KLEBE
General Manager
Ross Rose Mfg. Co.
Allegheny Ave. & Hancock St.
Philadelphia 33, Pa.

JAMES P. LINDSAY
Treasurer
Stonhard Co.
401 N. Broad St.
Philadelphia 8, Pa.

JOSEPH J. MACCOLINI
Laboratory Technician
Continental Diamond Fibre Co.
Bridgeport, Pa.

GERALD H. MAINS
Development Engineer
National Vul. Fibre Co.
Kennett Square, Pa.

FRANK M. MALY
Sales Manager
Baldwin Locomotive Works
Paschall P.O.,
Philadelphia 42, Pa.

ROBT. K. NAYLOR
Designer
Am. Viscose Co.
12 Wedgrove
Merchantville, N. J.

SAMUEL J. NOCITRA
Ass't Chief Engr.
Wm. Sellers & Co., Inc.
1600 Hamilton
Philadelphia 30, Pa.

EMIL E. NOVOTNY
Vice President
Durite Plastics, Inc.
Frankford Station P.O.,
Philadelphia 24, Pa.

JOHN PETROSKI
Owner
Cast Specialty Co.
2927 N. 6th St.
Philadelphia, Pa.

CLARENCE E. POWELL
Mgr. Machinery Div.
R. D. Wood Co.
1072 Public Ledger Bldg.
Philadelphia 5, Pa.

SAMUEL R. RHOADS
Sales Engineer
R. D. Wood Co.
Public Ledger Bldg.
Philadelphia 5, Pa.

EDWARD C. ROPER
Process Engineer
Panelyte Div.
St. Regis Paper Co.
N. Enterprise St.
Trenton, N. J.

HOWARD E. SHEARER
Head of Industrial Div.
American Viscose Corp.
P.O. 455
Marcus Hook, Pa.

PALMER L. SKOGLUND
Technical Rep.
Chicago Molded Prod. Corp.
No. 3 Swarthmore Place
Swarthmore, Pa.

NORMAN A. SKOW
Div. of Research
Synthane Corp.
Wayne, Pa.

W. EARL SNYDER
Mechanical Engineer
Wyeth Incorporated
1600 Arch St.
Philadelphia 3, Pa.

E. E. SMITH
Sales
Synthane Corp.
Oaks, Pa.

GEO. H. SOLLENBERGER
Plastics Sales
Rohm & Haas Co.
222 W. Washington Square
Philadelphia, Pa.

MEYER SPERBER
President
Sperber Co.
124 N. 15th St.
Philadelphia 2, Pa.

IRVIN E. SPIRER
Engineer
Sun Oil Co.
1608 Walnut St.
Philadelphia 3, Pa.

HOWARD S. STEVENSON
Buyer
Electric Storage Battery Co.
Allegheny Ave. & 19th St.
Philadelphia 32, Pa.

ALEXANDER C. WALL
Consulting Eng.
Oak Springs Farm
Hatfield, Pa.

LOUIS R. WANNER
Chief Engineer
Hugh H. Eby, Inc.
4700 Stenton Ave.
Philadelphia 44, Pa.

RICHARD F. WARREN, JR.
Chemist
Barrett Div.
Allied Chem. & Die Corp.
Mardoret & Bermuda St.
Philadelphia 37, Pa.

CLAYTON S. WETZEL
Sales
Rohm & Haas Co.
22 W. Washington Sq.
Philadelphia 5, Pa.

ALFRED J. WILLIAMS
Supvr. Cost & Payroll
Fletcher Works Inc.
Second St. & Glenwood Ave.
Philadelphia, Pa.

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New York Shipbuilding Co.
Camden, N. J.

ST. LOUIS SECTION

OTTO B. ANKERSHEIL
Owner
Marston Mfg. Co.
Marston, Mo.

BROOK BEATTY
Owner
Brook Beatty Plastics
214 W. 75th
Kansas City 5, Mo.

ERNEST BERNARD
Manager
Lami Cast Plastics
106 E. 14th St.
Kansas City 6, Mo.

ALVIN W. BRUST
Assoc. Prof. Civil Eng.
Washington University
Box 83
Skinker & Lindell Blvds.
St. Louis 5, Mo.

E. E. CHAMBERLIN
Plastic Sales Dept.
The Dow Chemical Co.
23 Parkland Ave.
Glendale 22, Mo.

E. G. ELLSTROM
Plant Supt.
Cent. States Paper & Bag Co.
2600 N. Broadway
St. Louis, Mo.

J. MAVER FEEHAN
Owner
The J. M. Feehan Co.
132 W. Big Bend Rd.
St. Louis 19, Mo.

JOHN P. GARESCHE
Illumination Engineer
Gross Chandelier Co.
2036 Delmar Blvd.
St. Louis 3, Mo.

CLAUDE M. GARNER
456 Carrswold Dr.
Clayton 5, Mo.

A. J. GERBER
President
Gerber Plastic Co.
2625 Locust St.
St. Louis 3, Missouri

A. J. GORMAN
Sales Engineer
Ward Engineering Co.
558 Paul Brown Bldg.
St. Louis, Mo.

WALTER J. GRUENEWALD
Die & Prod. Designer
Frank Adam Elect. Co.
3650 Windsor Pl.
St. Louis 13, Mo.

FRED R. HEARN
Salesman
Panelyte Div.
3980 Bowen St.
St. Louis 16, Mo.

ERNEST HOFFMANN
Mas. Mech. & Designer
Tip Top Prod.
1508 Burt St.
Omaha, Nebr.

T. L. JOHNSON
President
Armor-Flex Co.
8 Garden Lane
Kirkwood 22, Mo.

H. C. JOSEPHSON
Vice-President
Instant Freeze Corp.
Hanover, Mass.

R. W. KERR
R. W. Kerr Co.
220-222 S. Burlington Ave.
Hastings, Nebr.

WM. EDWARD KINCAID, JR.
5658 Clemens
St. Louis 12, Mo.

E. C. DOC. KOEGEL
Design Engineer
Edwin F. Guth Co.
2615 Washington Blvd.
St. Louis 12, Mo.

GEORGE R. KRIEGER
Engineer
Spaulding Fibre Co.
4485 Olive St.
St. Louis 8, Mo.

DAN OTTO
Manager
Plastic Parts & Sales
1157 S. Kingshighway
St. Louis 10, Mo.

HARRY R. PANCOAST
Sales Rep.
Con. Diamond Fibre Co.
4030 Chouteau Ave.
St. Louis 10, Mo.

HARRY F. PERKINS
4331 McRee Ave.
St. Louis 10, Mo.

JAMES O. PHELPS, JR.
President
Airpath Instrument Co.
Lambert Field
St. Louis, Mo.

A. DANIEL REISERT
Asst. Chief Engineer
Lincoln Eng. Co.
5701 Natural Bridge Ave.
St. Louis 20, Mo.

R. J. RICKENBACHER
Sales Eng.
Monsanto Chemical Co.
815 Paul Brown Bldg.
St. Louis, Mo.

EDMOND S. RINEHART
St. Louis Branch Mgr.
Spaulding Fibre Co., Inc.
4485 Olive St.
St. Louis 8, Mo.

ROBERT H. ROBINSON
Field Engineer
Spaulding Fibre Co.
4485 Olive St.
St. Louis, Mo.

LUTWIN C. ROTTER
Chief Engineer
Lincoln Engineering Co.
5071 Natural Bridge Rd.
St. Louis, Mo.

D. E. RUTISHAUSER
Chief Engineer
Hussmann Ligonier Co.
2411 N. Leffingwell Ave.
St. Louis, Mo.

F. R. SEAVEY
Engineer
Western Cartridge Co.
East Alton, Ill.

ROGER C. SHIRTUM
Engineer
Pasteuray Corp.
2667 Washington
St. Louis, Mo.

PAUL S. SUSSENBACH
Chief Chemist
Presstite Eng. Co.
3900 Chouteau Ave.
St. Louis 10, Mo.

RALPH M. THOMPSON
Branch Manager
Owens-Corning Fiberglas Corp.
2005 Continental Bldg.
St. Louis 8, Mo.

A. G. WERNER
District Sales Rep.
Chicago Molded Prod. Corp.
3650 Dover Place
St. Louis 16, Mo.

THOMAS J. WHITE
6 Ridgeline Dr.
St. Louis 22, Mo.

ROBERT WILKENSON
Alton Box Board Co.
Alton, Ill.

OTTO WULFERT
Mech. Engineer
Wagner Elec. Corp.
6400 Plymouth Ave.
St. Louis, Mo.

MAX H. ZIMMERMANN
Engineer
T. J. White Plastics Co.
9977 Manchester Rd.
Kirkwood 22, Mo.

TOLEDO SECTION

E. H. BALZ
Research Consultant
R.F.D. No. 2, Box No. 302
Toledo, Ohio

N. E. BECK
Secretary
United Engr. Co.
16 Broadway
Toledo 4, Ohio

H. D. BENNETT
President
Defiance Machine Wks.
814 Toledo Trust Bldg.
Toledo 4, Ohio

MERVIN JAMES BLYTHE
Sales Engr.
Defiance Machine Wks.
814 Toledo Trust Bldg.
Toledo 4, Ohio

VICTOR W. BOEKER
Product Engr.
Owens-Corning Fiberglas Corp.
Nicholas Bldg.
Toledo 1, Ohio

CLOYD L. BUGERT
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Toledo 6, Ohio

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Toledo, Ohio

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Libbey-Owens-Ford Glass Co.
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Measuring Flow of THERMOSETTING PLASTICS

by E. F. BORRO and L. A. SONTAG

Edward F. Borro of Durez Plastics and Chemicals, Inc., is a member of SPE, affiliated with the Buffalo Section. He is a pioneer in the plastics industry, being identified with plastics in its early days as a member of Charles Burroughs' staff in 1918 and has been connected with the industry continuously since that time.

Lothar A. Sontag, Director of Molding Compound Research, Durez Plastics and Chemicals, Inc., is serving on several A.S.T.M. committees and is chairman of Committee D-9 on Molds and Molding. Mr. Sontag is a graduate of Worcester Polytechnic Institute.

Thermosetting molding materials have the unique property of setting to a hard infusible mass in a relatively short time when molded under heat and pressure. During the transition period the material is capable of flowing, but at a more or less continually changing rate.

The measurement of this ability to flow has taxed the ingenuity of all who have attempted to solve the problem. However, a method published within the last few years by the American Society for Testing Materials, designation D 731-44T, can be successfully used to analyze this flow quite completely.

From time to time in the past, different methods and equipment for measuring flow have been described in the literature of the industry. Notable examples are the Bakelite Olsen flow tester, the Bell Telephone Laboratories' multiple orifice mold, the Western Electric Corporation's single orifice mold, the multi-cavity mold, the parallel plate method, and the British cup method. Probably the oldest method is based on the principle of measuring the closing time of a cup mold operated at a constant temperature and pressure. Although this system has, for various reasons, been the one most severely criticized it is, nevertheless, the method that is used most widely when others fail as, for example, in the testing of fabric-filled materials. The A.S.T.M. method and the method described in this article are modifications of this old cup method.

In the interest of standardization, the A.S.T.M. method was investigated and found to be quite satisfactory after a few slight modifications. This modified method is limited to measuring the batch-to-batch uniformity of a given plastic. However, it can also be used to distinguish the different characteristics of various types of thermosetting materials. The sensitivity and accuracy of this method are very satisfactory, and it should find wide use throughout the industry.

EQUIPMENT USED IN MODIFIED CUP METHOD

The apparatus consists essentially of a cup mold of the flash type, well cored for steam heating and mounted rigidly in a press capable of applying any of the prescribed pressures uniformly during the closing period. The di-

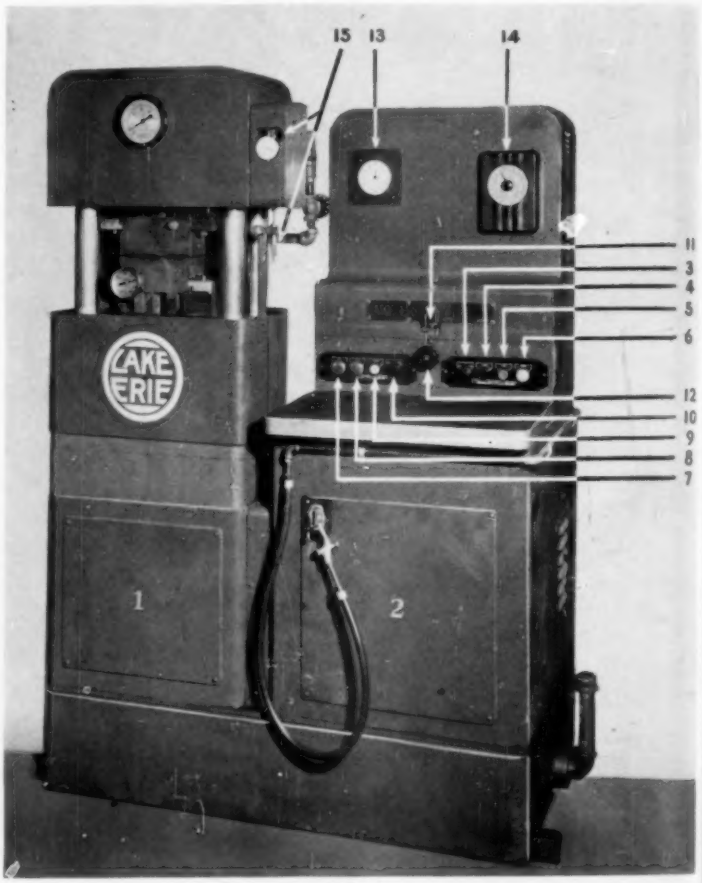


FIG. 2

OPERATING DETAILS OF THE PRESS

1. 15-ton press, double-acting 4-in. diameter ram.
2. Pumping unit, variable displacement, one-way pump.
3. Selector switch for 0.008 and 0.026-in. fin.
4. Motor starting button.
5. Motor stop button.
6. Motor light.
7. Press closing button for manual operation. Also for energizing automatic action when the selector switch (10) is in automatic position.
8. Stop button "manual operation."
9. Return stroke button "manual operation."
10. Selector switch for manual or automatic action.
11. Pressure positions for total press pressures of 2500, 5000, 10,000, 15,000, 20,000, 25,000 and 30,000 pounds.
12. Handwheel for selecting predetermined pressures in a desired pressure position (11).
13. Mobility timing clock. The clock is energized by the resistance of the material within the cavity, at a total force of 1000 pounds. It continues to operate until the mold closes to 0.008 or 0.026-in. fin. It is de-energized by 15.
14. Cycle timer for curing.
15. Micrometer and dial indicator for original setting of fin thickness and de-energizing switch for 13.

mensions of the cup and mold are shown in Fig. 1 and are the same as those in A.S.T.M. designation D 731-44T. The mold is constructed somewhat differently from those used for ordinary practice. It will be noted that, because of this construction, a fin of less than 0.006 in. cannot be molded.

The press used in this method was designed by Durez Plastics & Chemicals, Inc., engineers in cooperation with Lake Erie Engineering Corp. It is of 15-ton capacity, hydraulically operated with a 4-in. diameter double-acting ram (Fig. 2). The double-acting ram reduced the possibilities of friction to the minimum—a condition essential for accurate test results. The hydraulic pump system is of the variable displacement type with ample capacity to insure uniform press travel one inch per second at various pressures. The various pressure stages between 2500 and 30,000 lb. are obtained by a separate relief valve mechanically controlled by a gear and rack arrangement (shown at 11 in Fig. 2), To set the desired pressure, a handwheel (12 in Fig. 2) is turned to one of the pressure positions until a 45° latch springs into the desired pressure position on the rack. This operation requires approximately 3 seconds.

Mold closing time is measured by a combination of a dial indicator, a micrometer (15 in Fig. 2) and an electric clock (13 in Fig. 2). The clock is started by means of the material resistance within the mold at a total force of 1000 pounds. The clock continues to operate until the press is closed to the required fin thickness of either 0.008 or 0.026 inch. Closing time is then recorded and the clock manually reset to zero for the next test. The mold is steam heated, and it is equipped with a steam-reducing valve for maintaining proper steam pressure. The mold temperature of 320°F. is indicated by a Weston dial thermometer screwed into the bottom half of the mold.

In the operation of the test seven different forces are called for—namely, 2500, 5000, 10,000, 15,000, 20,000, 25,000 and 30,000 pounds. The projected area of the cup is 3.8 sq. in., and the ram area is 12.6 sq. inches. Therefore, the respective molding pressures required to produce the above forces are 658, 1315, 2630, 3945, 5260, 6275 and 7890 p.s.i., and the oil pressures are 200, 400, 800, 1200, 1600, 2000 and 2400 p.s.i. An ordinary high-quality gage can be used to measure these pressures and obtain a reasonable degree of accuracy over a long period of time. A gage used every day in this manner over a period of one year changes a negligible amount when checked frequently. A special device, consisting of a small piston working against oil in a cylinder provided with a pressure gage previously calibrated against known loads, was used to check the press. This was done by placing it directly over the cavity of the cup mold with the force of the cup mold bearing directly on the piston of the testing device.

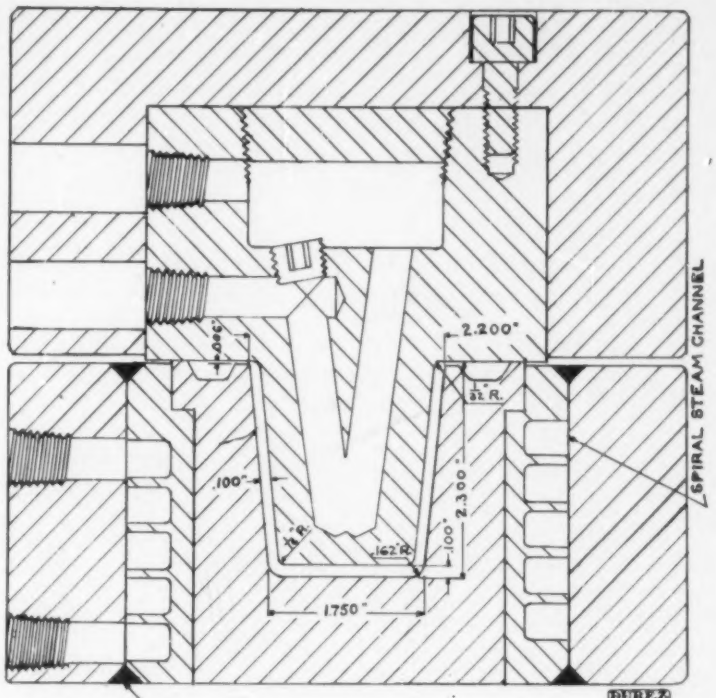


FIG. 1

HOW THE TEST IS MADE

The operation of the test is as follows. The weight of the test sample is first determined by molding a cup under the highest designated pressure, producing a cup having a fin thickness between 0.006 and 0.008 inch. As mentioned previously, the design of the mold prevents a cup with a fin of less than 0.006 in. from being molded. The weight of the cup must be determined by trial and error unless the specific gravity of the molded material is accurately known beforehand, in which case the total charge can be calculated from data for other known materials. The total charge for each test is 1.1 times the weight of the cup minus all flash and fin. In this way the flash is always 10 per cent of the weight of the cup. Loose powder is used for all but high impact material.

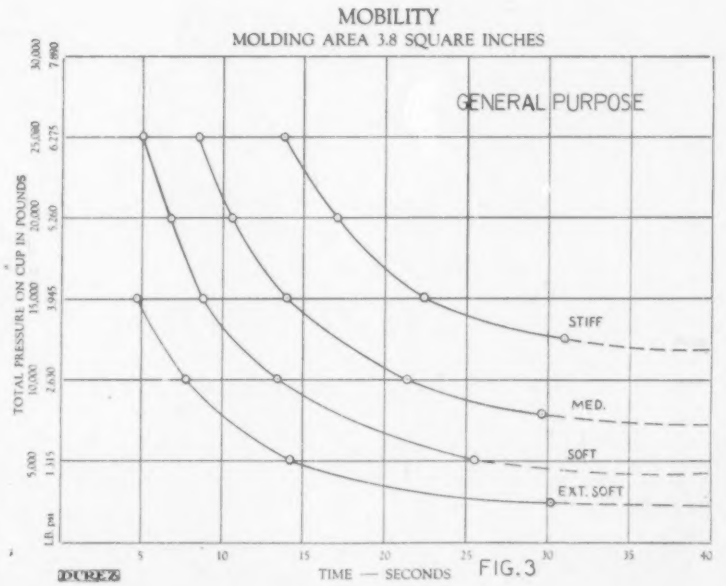


FIG. 3

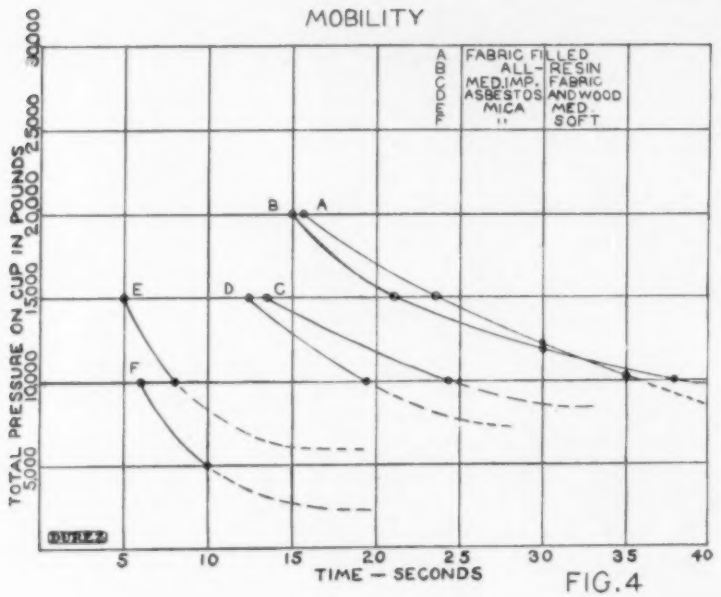


FIG. 4

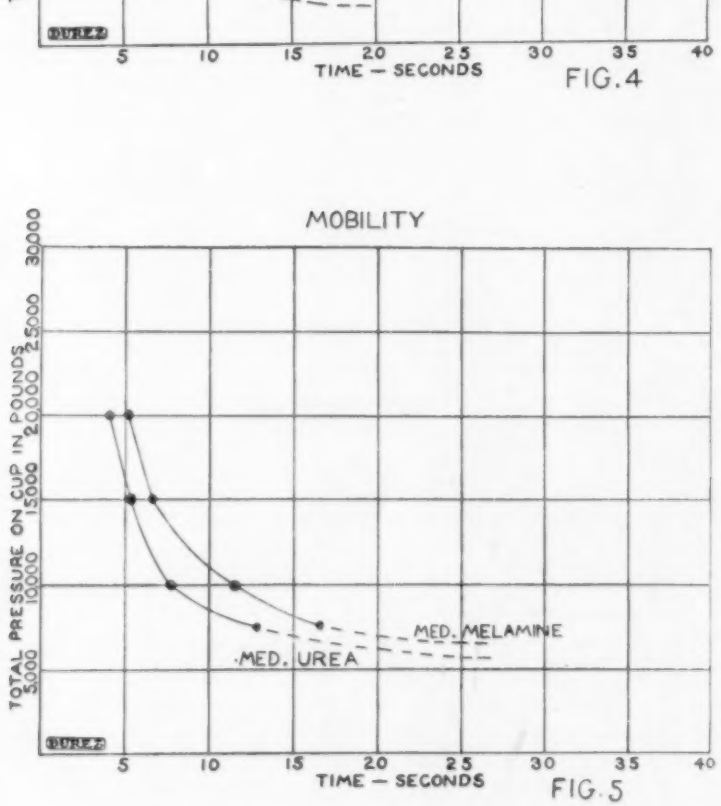


FIG. 5

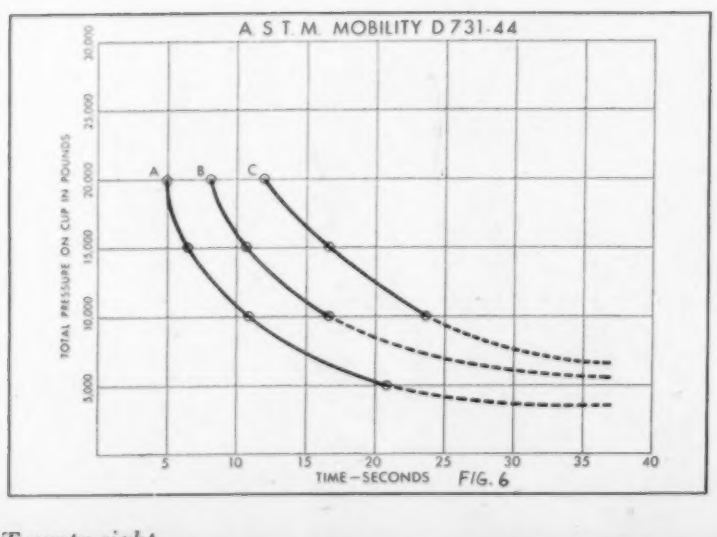


FIG. 6

For the initial test on an unknown phenolic general-purpose material, the fin-thickness switch is set for an 0.008-in. opening and a force of 2500 pounds. The time of closing is recorded, provided the material is soft enough to allow the mold to close. In either case, the test is repeated using 5000, 10,000, 15,000, 20,000, 25,000 or 30,000 lb. force, as the material in question may call for, or until a sufficient number of points have been found to draw a curve (as shown in Fig. 3).

This may seem like considerable work to test one material. However, after some experience with the tester, one usually finds that the determination of the closing time under three pressures is sufficient to completely identify flow characteristics of an unknown material, and under one pressure or possibly two for a known material. Running the test under the several pressures also acts as a check on the accuracy of the operator. In Fig. 3 are shown four curves of a general-purpose woodflour-filled phenolic, commonly used in industry, having extra soft, soft, medium, and stiff flow characteristics. For those familiar with the Durez plasticity scale, these correspond to 18, 12, 8 and 6 units. The curves for the general-purpose materials have been extended considerably beyond points which have been determined, as indicated by the dotted lines in Fig. 3. The exact location can, however, be determined accurately if desired, but for most purposes it is not essential.

For determining the flow characteristics of impact materials above 0.5 ft-lb./in., the same procedure is followed except that the base weight is determined on a cup with a fin under 0.026 in. thick and the fin-thickness switch (3 in Fig. 2) is set for the 0.026-in. opening. This change in the method for impact materials is essential, since it is impossible to cut the fin down much less than 0.026 for materials containing fabric and tire cord filler.

WHAT THE TESTS SHOW

In Figs. 4 and 5 are shown curves for various types of materials commonly used in the industry. Mica-filled phenolics, ureas, and melamines have pressure-time curves with steep slopes which appear in the short time portion of the graph. In contrast, general-purpose phenolics have slightly longer flow periods, as shown in Fig. 3. All-resin molding compounds have even longer flow times on low pressures and are consequently more pressure sensitive than time sensitive.

The effect of moisture can be shown easily by the relative position of curves in Fig. 6. Plasticity or mobility of the material changes considerably with the percentage of moisture or volatile matter. What is actually of most interest to the molder is—will there be any difference in the required molding pressure? Of course there will. At 10,000 lbs. total force and 2630 psi, a general-purpose material containing 6.8% volatiles re-

quired 10.8 seconds to close the mold; 4% volatiles required 16.8 seconds; and 2.7% volatiles required 23.5 seconds. Mobility difference of over 100% between low and high volatiles can often present serious difficulties.

The effect of temperature on molding pressures is quite apparent. For example, in molding a general-purpose material at 350°F., one molding plant is having splendid results at 2630 psi while another, or even the same plant, on a duplicate set of molds is having difficulties. That is understandable particularly if the temperature is low. Curve chart Fig. 7 illustrates the difference in closing time between 320°F. and 350°F. at various pressures. For example, at 10,000 lbs. total force and 2630 psi, 17.6 seconds are required to close the mold at 350°F. and 25.3 seconds at 320°F. Closure materials show an even greater difference, as illustrated on curve chart Fig. 8. At 15,000 lbs. total force, 3945 psi, 15.6 seconds are required to close the mold at 350°F. and 32 seconds at 320°F.

Pressures required for the various methods of preheating are illustrated on curve chart Fig. 9. Test A: General-purpose preformed material in "as received" condition required 19.8 seconds to close at 2630 psi. Test B: Preforms preheated in an electric oven at 230°F. for 15 minutes required 5.5 seconds to close. Test C: Preforms preheated on one side by means of infra-red lamp required 9.7 seconds to close. Test D: Preforms preheated on both sides by means of double infra-red lamps required 6.5 seconds to close. Test E: Preforms preheated by high frequency for 30 seconds at 240°F. required 1 second to close or 3.6 seconds at 1315 psi.

MOLDING PRESSURES

It is possible to use the results obtained in testing the mobility as basic figures to determine the required molding pressures, with a close degree of accuracy. The depth of the mobility test cup is actually 2.200". However, since the test mold has a definite .006" clearance on the flash land, it requires less pressure than a mold which has a positive land. To compensate for this difference, 2" depth is used for the basic figure. When molding anything from flat up to 1" depth, subtract 700 lbs. and over 2" depth add 700 lbs. for each additional inch of depth. For example, if the available molding pressure is 2500 psi and the desirable closing time for a material in "as received" condition is 15 seconds, we should select the "soft" material which has closed in 13.5 seconds at 2630 psi as illustrated on curve chart Fig. 3. Of course, this pressure is suitable for a part 2" deep. When molding a part 1" deep or less, the same material can be molded at 2000 psi or medium material can be used.

When unknown materials are tested, it is well to obtain tests at various pressures so that a complete curve can be drawn. For known materials and routine testing, one or two tests are

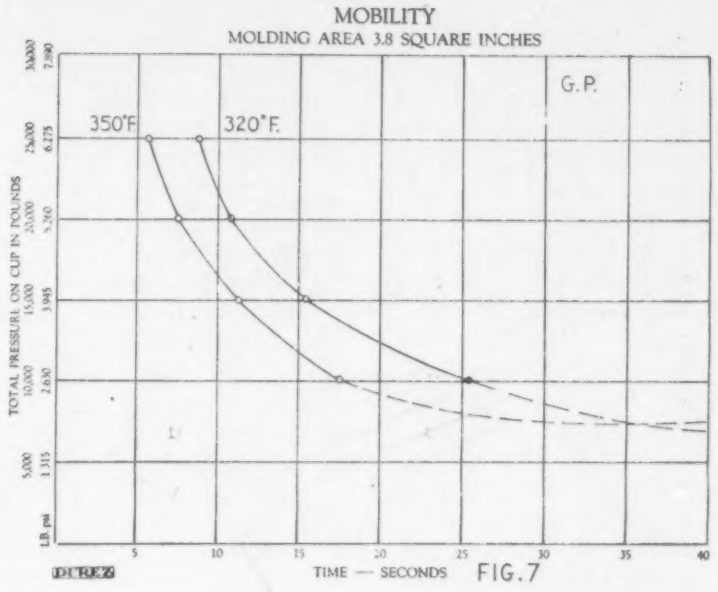


FIG.7

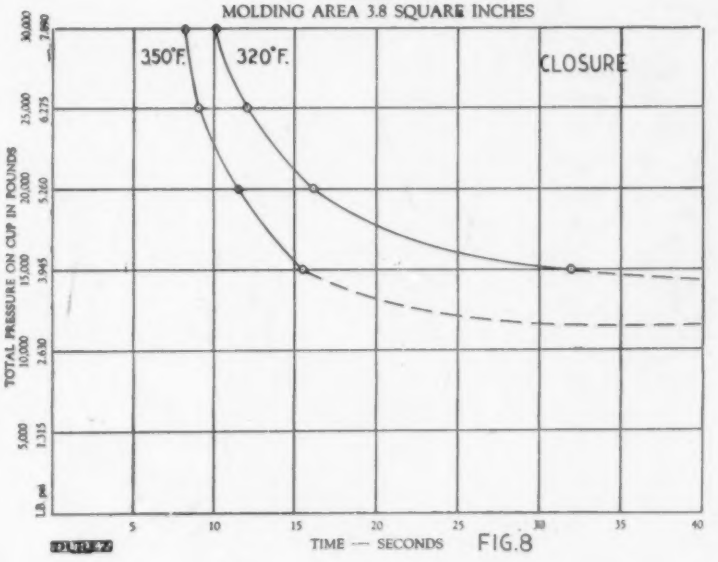
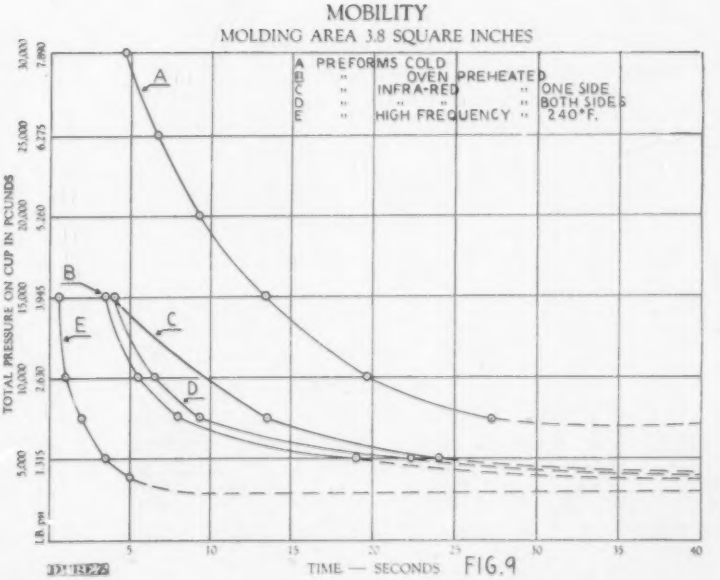


FIG.8


MOBILITY
MOLDING AREA 3.8 SQUARE INCHES
A PREFORMS COLD
B " OVEN PREHEATED
C " INFRA-RED " ONE SIDE
D " " " " BOTH SIDES
E " HIGH FREQUENCY " 240°F.
TOTAL PRESSURE ON CUP IN POUNDS
LB. psi
TIME — SECONDS
DUREZ
FIG.9

all that are required to establish the position of the curve. In this way many tests can be run in a very short time, particularly when they are used as control tests in the manufacture of thermosetting plastics.

MEANS OF EXPRESSING TEST RESULTS

In the past, the words flow and plasticity have been used to describe the flow properties of a thermosetting plastic. The American Society for Testing Materials proposes the use of the word mobility. It is suggested, when this method is used, that the mobility of a thermosetting plastic be expressed as the minimum force required to close the standard cup mold.

For practical purposes measurements using increments of 5000 lb., except for the first step of 2500 lb., seem adequate. However, any desired degree of accuracy can be obtained by dividing the pressure scale into smaller units. It is limited only by the means of measuring and maintaining constant pressure under all conditions of closing the mold.

The flow time can be used for measuring batch-to-batch uniformity. The relative positions of the curves when the minimum pressure or mobility is the same, indicate rate of flow. If it is necessary to express the closing time with pressure, it is suggested that it be written as a subscript, i.e. $500/_{25}$, meaning that it required 25 sec. for the mold to close under a force of 5000 pounds. The data required for expressing the complete flow characteristics of a material can then be written as a series of such numbers. For example, data for the medium general-purpose phenolic in Fig. 3 are:

25,000/8.5 20,000/10.7 15,000/14.0 10,000/21.5
8,000/29.5 5,000/no close

In order to further simplify this expression, each force can be expressed in 100-lb. units. The data are then written:

250/8.5 200/10.7 150/14.0 100/21.5 80/29.5 50/no close

ADVANTAGES OF MODIFIED CUP METHOD

The advantages of this method are many. It is a fast, practical test which can be useful for observing many properties of a plastic, such as appearance, cure, and ability to mold. These are of vital importance to a molder. It can be used to show what happens to materials when they are preheated electronically or by means of an oven.

When material can be used in powder or pill form, the effect on flow characteristics can be shown easily.

The method can be used to test all types of thermosetting plastics, fabric-filled as well as general-purpose. A study of the time-pressure curves gives a complete picture of the material for all practical purposes. Those familiar with the molding characteristics of the common types of thermosetting materials can quickly interpret the result of the tests and put them to practical use.

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NEWARK EVENTS

By E. G. Ackerman

The June meeting, the last until the Fall, of the Newark Section will bring to a successful close a programme of interesting discussions on all phases of the Plastic Industry. The quality of these meetings has been outstanding in the timeliness and interest of the general subject and the response given to each speaker. This has largely been due to the fact that each member is allowed expression at the end of each address by means of a round-table discussion.

The June meeting will be addressed by Mr. M. L. Macht of Du Pont and Mr. Robert Brannon of Bakelite Corp. Mr. Macht will have as his topic the possibilities and limitations in the Blanking of Plastics. Mr. Brannon will deliver a resume of plastics covering briefly, but comprehensively the discussions of previous meetings. The meeting will be held, as usual, at the Newark Athletic Club and preceded by a dinner. Harold Frutchey is keeping the favors which has been the custom to give out each meeting, a secret.

Mr. Art Warner of Federal Telephone and Radio, and Assistant Treasurer of the Newark section, has recently returned from a business trip to England where he conferred with fellow members of the company and discussed the possible application of plastic insulated wire to the telephone systems. He noted that the plastic situation in England is much more serious than in the United States and that because of the curtailment of plasticizers from the United States they are going back to dibutyl phthalate. A new British Nylon plant in South Wales is near completion.

On the subject of British Plastics, it might be noted that the older and well established Casein and Celluloid plastics still maintain their position but the newer thermoplastics are entering wider fields than has been possible during the past years. Phenolics seem to be in difficult situation as in spite of the availability of a greater tonnage than has ever before been produced, the demand is still enormous. However, regardless of the critical material supply, one dominant note runs throughout and that is, absolute and complete confidence in the future whatever the trials and tribulations of the present.

TOLEDO IN THE NEWS

By E. J. Sullivan

The Toledo Section closed the first semester of the year 1946 with a talk by Mr. J. H. DuBois, Executive Engineer of the Shaw Insulator Co., Irvington, N. J. Mr. DuBois began by pointing out the fundamental rules of molding thermosetting materials and then proceeded to show the advantages of transfer molding. His talk was well illustrated with slides showing many adaptations of the transfer molding process. That he aroused and held the interest of the members was attested by the part they took in the question-and-answer period that followed his lecture.

The fact that an Executive Council meeting was held in Toledo the same day, May 21, gave the members an opportunity to meet some of the officers. Harry McGowan, Jean Reinecke, Bill Hoey, R. B. Bower, graced the dinner and the meeting along with others.

The next meeting will be a social affair at the Chippewa Country Club, consisting of a golf tournament and other diversions. Mr. Quen Winter, Program Chairman, announced that Mr. Carl Risley, Personnel Manager of the Owens-Illinois Glass Co. Closure Plant would handle events for the day, and that Mr. E. J. Sullivan would be in charge of the prizes, which might be donated. At this writing it is planned to have prizes for just about all who take part in the tournament, which will be of the 'blind par' variety. The members will state their handicap before teeing off—naming the number of strokes that will have to be knocked off their scores before they can get down into the blind par bracket, which is usually between 70 and 80.

This will be the second of these outings and will be held June 4. Last year's affair was well attended and was enjoyed by all who were present. Begun as an experiment, these summer meetings bid fair to be a high mark of the year in the members' interests. Part of the cost is defrayed by the section, for paid-up members, partially to nudge the delinquents and partially to benefit those who have been prevented from attending their share of the meetings during the first semester.

The Plastics Exhibit, sponsored by the Toledo Section, was ready to be displayed at its permanent location in the Museum of Science and Industry at the Toledo Zoological Park on May 30. The preliminary showing at the Toledo Public Library several months ago aroused considerable interest and favorable comment.

Detroit Staging Golf Party

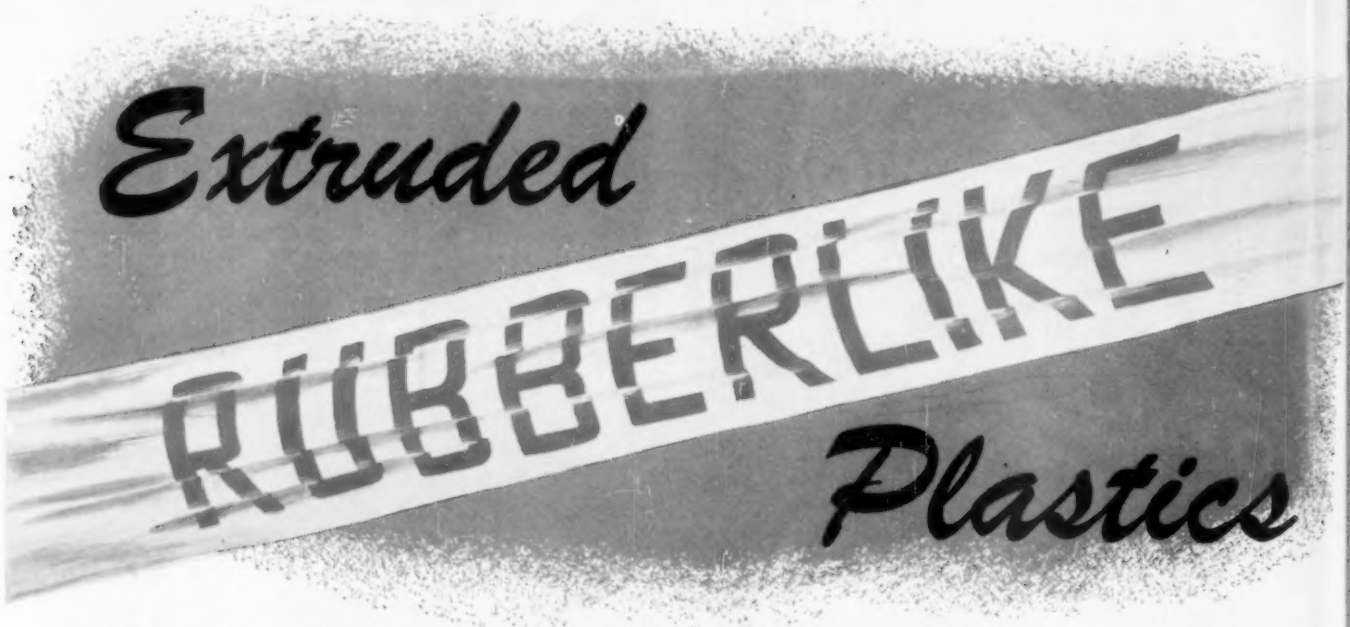
Detroit Section is staging its first summer golf party at Glen Oaks Country Club on Friday, July 12th. There will be some intersectional rivalry as Toledo Section has been invited and a number of golfers from the Ohio City are expected to attend, and they are determined to carry back some of the prizes.

The first foresome will tee off at one o'clock, and numerous prizes have been obtained. The dinner will be held in the club house at 7:00 p.m. Glen Oaks Country Club is located on Thirteen Mile Road west of Northwestern Highway.

The Golf Committee consists of Josh Miller, Chairman, George Gress and John Slater.

CORBIN AT MILWAUKEE

At the last regular meeting of the Milwaukee Section, Paul Corbin spoke on "Plastic Coated Fabrics." Mr. Corbin is president of the Toledo Section and is manager of the Press Polish and Laminated Plastics Division at Textileather Corporation of Toledo. The next regularly scheduled meeting of the Milwaukee Section is planned for September 26, when William Black will speak on "Materials and Their Applications."



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INDIANAPOLIS EVENTS

By W. O. Gebhart

At the May seventeenth meeting applications for membership were received from John M. Sell, sponsored by Eugene Quear, and from Dale E. Hickey, sponsored by Irwin Heck.

The ultimate in something was also accomplished: Louis Sereinsky got the initiation fee from a prospective member, but the application will come in later. The gentleman got no receipt for his money either.

Our Vice-president was in Canada fishing, but in spite of this we had twenty-six eaters at this meeting.

Winter Hull showed numerous examples of the use of plastics in mechanical refrigerators. It seems that in 1925 the average refrigerator used about two cents worth of rubber; now about one dollar's worth is spent. In the early days only ten or fifteen cents was spent for plastics; now over six dollars is gladly allotted to plastics.

This change is due to the desirable properties of plastics as recognized by the refrigerator engineers, and to the excellent selling job done by the materials men.

The above mentioned examples ranged from tiny terminals of wood flour phenolics, through evaporator doors and escutcheons of polystyrene or acetate, to door liners and moldings of compression molded laminates.

Mr. R. G. Dailey, Standard Products Company, and a member of the Detroit Section discussed injection molding of enormous pieces. His company owns those large 36 ounce injection machines having four injection cylinders.

Mr. Dailey also had an imposing display of examples ranging from knobs and small doors of acetate, through evaporator doors and large escutcheons of polystyrene, to relatively large radio cabinets of acetate propionate.

He stressed the fact that the users of molded plastics would profit greatly if they would call in the plastics molders early in the process of design for a new application. Mr. Dailey was particularly concerned over irresponsible misuse of molded plastics and the consequent reflection on the plastics industry.

We'll see you all again on September twentieth which meeting will be arranged by Ralph Waddington. Good fishing this summer!

CLEVELAND NEWS

By W. P. Rupprecht

The Cleveland Section of the Society of Plastics Engineers heard Jack Morrison, Sales Manager, The Detroit Mold Engineering Co., Detroit, Mich., speak at the regular monthly meeting held at Cleveland Club, Friday, May 24. Representing the pioneers in standardization of plastics molds, Mr. Morrison gave some up-to-the-minute reports on the company's recent developments which have been appearing in increasing numbers.

Since the meeting was one day after the opening of the Mid-America Exposition in Cleveland Public Hall, the program committee arranged for a representative of the plastics section to bring us a report on the exhibit. In addition, the members heard details of the S.P.I. National Plastics Exposition from those who attended this show in New York.

One of the recent developments announced by The Detroit Mold Engineering Co., are the mold bases for plunger molding. In this process, the transfer of the molding compounds is effected by a ram, or rams, actuated separately from the clamping mechanism. A bushing extending to the parting line, replaces the transfer pot. Reports indicate savings of 50 per cent of pressure, lower die costs and less waste. DME Standard Base, No. 2A-60 is applicable to this type of molding.

The June meeting of the Cleveland section will be devoted to the second love of most of our members, baseball. The American League baseball movie will be shown, preceded by a few remarks by Jack Graney, Cleveland sports caster.

Jack Graney, former star of the Cleveland ball club, has broadcast the Indians' games for several years. He has earned the respect of Cleveland ball fans for his straightforward accounts. The movie, sponsored by the American League, will show the 1945 World Series game.

At the May meeting, Jack Morrison, Vice-President, Detroit Mold Engineering Co., gave an interesting account of the development of standard mold bases. Judging by the amount of discussion which followed, the subject was of utmost interest to all present.

Prince Industrial Plastics Corporation has moved its offices and plant from 7400 Stanton Avenue to 8107 Grand Avenue, Cleveland 4, Ohio. Operations have been expanded in the new location in injection, compression and transfer molding of plastics, as well as mold design and mold making. Warren Prince, president of the firm, is also president of the Cleveland Section of SPE.

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G. L. SELLS PASSES AWAY

G. L. (Les) Sells died at St. Joseph Mercy Hospital, Pontiac, Michigan, on Friday, May 24, after a long illness. Mr. Sells was Chief Engineer of Plastics Research Corporation and had served as Chairman of Detroit Section Publications Committee in 1944.

ST. LOUIS SECTION GROWS
To Incorporate Plastics Club
By Dan Otto

The St. Louis Section of the Society of Plastics Engineers met May 23 at the DeSoto Hotel. Our President, Mr. Al G. Werner of the Chicago Molded Products Co., gave a report on the S.P.I. show at New York last month. A total attendance of 87,000 for the week indicated an ever growing interest in plastics by the public at large. The SPE booth at the show of course, proved to be a gathering place for members from all over the United States.

Mr. Werner also gave a report of our own SPE organization which we hope will have about 18 sections in various parts of the country by the end of 1946.

The local organization known as the St. Louis Plastic Club has decided to disband and become a part of the St. Louis Section of the SPE which should reflect itself by a large gain in membership.

Mr. Kreiger, area representative for the Spaulding Fibre Co., gave an illustrated talk on canvas based laminates as compared to metals such as brass, aluminum and cold rolled steel on a basis of cost per pound plotted against weight ratio. It was shown that in many cases the laminate was actually cheaper.

Mr. Tom J. White of the White Plastics Co. gave a talk on problems in compression molding. He indicated that the use of electronics by cutting down die maintenance and speeding up cycles had made possible molding jobs which previously had been considered out of the question.

He also talked about the latest developments in plunger molding.

Prof. A. W. Brust of the Washington University outlined the necessity of setting up the proper testing methods to fit the individual application. It was brought out that it is necessary to test materials before setting up specifications for a particular application and then testing again prior to the production run.

N. W. PENN. EVENTS
By Paul Roche

The Northwestern Section, Society of Plastics Engineers, held its final meeting for the 1945-1946 season at the Press Club, Erie, Pennsylvania, on Thursday, May 23. Dinner was served at 7:00 P.M., followed by business meeting at 8:00 P.M.

The evening's speaker was Mr. M. L. Macht, manager of Technical Service, Plastics Department, E. I. duPont de Nemours & Company, Arlington, New Jersey. Mr. Macht was accompanied and assisted by Mr. Martin Shaw, also of the duPont Company. Commencing his talk with the showing of a duPont sound movie "Plastic Applications and Fabricating Techniques," Mr. Macht offered interesting supplementary comments and illustrations. He brought with him several hundred interesting specimens of plastic applications, showing extruded, fabricated, and molded lucite, luminescent and phosphorescent plastic materials, molded and extruded nylon applications, etc. He cited some of the more current advancements in the industry, touching upon new materials such as cellular cellulose acetate. A very enlightening selection of slides were projected on a screen in addition to the sound moving picture.

On the same program an added feature was presented. The new Erie Dispatch Herald movie "Erie Gem City of the Lakes" was shown. This was enjoyed very much by those in attendance, including men from Erie and the surrounding towns, because of its well organized, enlightening, and professional composition.

Northwestern Pennsylvania Section member Edward H. Roberts of General Electric Company, Erie plant, was recently awarded a citation by the United States Navy, Bureau of Ordnance, for "outstanding performance in connection with research and development of laminated plastic tubes for rocket launchers used by the Navy on airplanes and LSTs." This research work was carried on at the Erie General Electric plant, in which Mr. Roberts is connected with the Refrigerator Cabinet Engineering Section.

The Northwestern Pennsylvania Section will take a summer recess during the months of June, July and August. A social gathering is being organized for the paid up members of the Section, to be held during the month of June. Mr. K. A. Rouzer of Presque Isle Plastics (and treasurer of the Section) is in charge of arranging the program.

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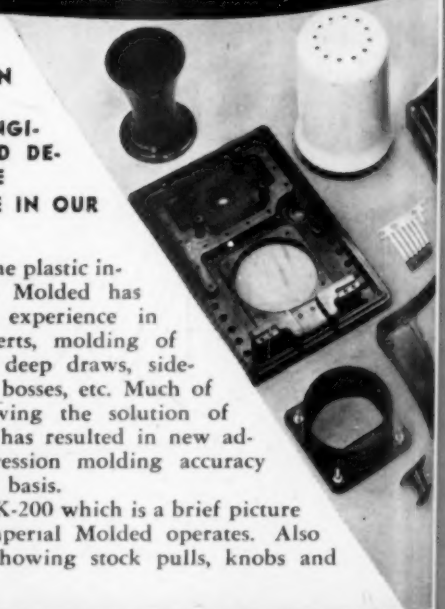

As a pioneer in the plastic industry, Imperial Molded has acquired broad experience in handling of inserts, molding of threads, making deep draws, side-cores, horizontal bosses, etc. Much of the work, involving the solution of tough problems, has resulted in new advances in compression molding accuracy on a commercial basis.
Ask for Bulletin K-200 which is a brief picture story of how Imperial Molded operates. Also Bulletin K-100 showing stock pulls, knobs and handles.

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CHICAGO LOOKS FORWARD

By J. A. Boyajian

The Chicago section is having an excellent start for the early part of the year by adding thirty-six new members. An additional twelve applicants were approved for membership in the society at our last meeting May 3rd, 1946.

Tentative plans for the next S.P.E. National Show to be held in January 1947 were discussed. Activities for the Technical Group were discussed and it was decided to set aside a fund to cover the future expenses for carrying on the activities of this group.

The annual golf tournament will be held sometime in July and everyone is looking forward to this day of outing and relaxation.

Three very fine talks were given at the May 3rd meeting. Mr. M. V. Kemper, of Improved Paper Machinery Corp., who talked on Vertical Clamping, Side Injection Presses and Trends. Mr. Dale Theobald, Manager Machinery Division, Van Dorn Iron Works, who talked on their new power operated low cost, injection machine of one ounce capacity. Mr. Frank Neukirch of N.R.K. Manufacturing & Engineering Co. who talked on their new Plasticor toy injection machine. Questions and answers followed these talks.

Considerable interest was quite evident by the 127 members and non-members who were present that evening.

The next meeting of June 4th, 1946 was held at the Merchants and Manufacturers club where two lectures were given. Mr. Edward F. Borro, Development Engineer, Durez Plastics Chemical Inc. spoke on A.S.T.M. Mobility Test for Thermosetting Materials. Mr. William Goggin, Sales Manager, Dow Chemical Co. spoke on German Plastic Fabrication. Both lectures were illustrated with slides.

DETROIT IN THE NEWS

By Fred Conley

The Detroit Section meeting for June will be held on June 28. The after-dinner speaker will be Mr. B. H. Hertzberg of the Guardian Glass Company, Detroit, who will speak on "The Role of Plastics in Safety Glass." Mr. Hertzberg is a raconteur of some note and will follow the above talk with some interesting stories. At this meeting there will also be shown sports movies.

Frank Sanford has returned to the Celanese Detroit Office after two years in the U. S. Navy. Frank was Secretary of Detroit Section at the time he entered the Navy.

On August 16 there will be another Golf Tournament for the Detroit Section.

Mr. Fred Henkel, 1080 West Maple, Birmingham, Michigan, has returned from the armed services and will continue his membership in the Detroit Section.

Mr. Kenneth W. Macksey has transferred from the Detroit to the Newark Section.

Roy H. Dean, formerly with Ternstedt Mfg. Division of General Motors Corporation, has transferred to Miami Valley Section. He is now employed at Kurz-Kasch, Inc., of Dayton, Ohio.

Roy H. Cunningham has transferred to Newark Section. He is with the Hemco Plastic Division of Bryant Electric, Bridgeport 2, Conn.

Lt. R. H. Dykehouse, a new Junior member of this Section, is with the 706th Ord. Co., APE No. 6, c/o Postmaster, San Francisco, wants all publications, etc., sent to him at this address. He is commanding officer of the 706th Ord. Co. located in Chonju, Korea.

Fred E. Schwab, partner of Schwab & Frank, Detroit, has returned from the armed services.

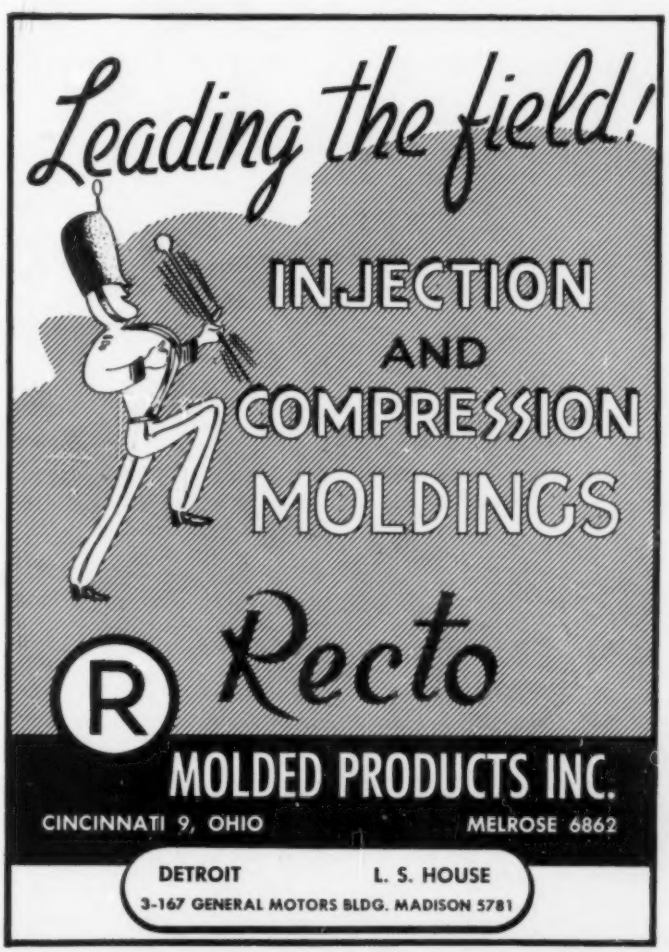
Lee Axford, recently Chief Draftsman of Gerity-Michigan Die Casting Company is now Chief Engineer of the Detroit Division. Prior to his connection with Gerity-Michigan, Mr. Lee was with Chrysler Corporation in the Rubber and Plastics Laboratory for many years.

MIAMI VALLEY NEWS

By J. G. Braden

The Miami Valley Section of SPE had their June meeting on Thursday, June 6th, at the Engineers' Club in Dayton, Ohio. The speaker for the evening was Mr. Jack Morrison of Detroit Mold Engineering. Mr. Morrison discussed the work which his company is doing in supplying standard parts for the construction of plastic molds and dies.

The June meeting was the last of the meetings held in the 1945-46 series. Miami Valley Section does not plan any activities during summer months.



EXECUTIVE SECRETARY (Cont. from page 2)

program and budget in cooperation with the Chairman of the Finance Committee.

During the interim until February 22nd, the President, Council, and Advisory Board considered the qualifications of several available men. A Council meeting was held with two members of the Advisory Board present on February 22 at which a half day was spent discussing the requirements of the position and the qualifications of known candidates.

The President received the opinion of the Councilmen in a secret ballot in which they were requested to vote for their choice. The Members of the Advisory Board present acted as tellers of this ballot. These were Messrs. Harding and Waite, who with Mr. Little, Publicity Chairman, can verify that Mr. W. B. Hoey was approved by the majority of the Directors present. Accordingly the President appointed Mr. Hoey as Executive Secretary.

As a separate part of the discussion the matter of remuneration was discussed. There was no difference in the salary of $8000.00 annually which had been ascertained to be required by the two leading candidates. Consultation with the Finance Committee revealed that the budget would allow this expenditure. The Council approved the budgeted expenses as given in the minutes of this meeting. I believe that we have been wise in the foregoing actions as results are already beginning to show.

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BUFFALO NEWS

A meeting of the National Professional Activities will be held at the Statler Hotel, Buffalo, at 7:00 p.m. on Monday, June 24th. The meeting will be in charge of William L. Hess, Vice-Chairman, as John Mickey, Chairman, will be unable to attend.

The June "Outing" meeting date is being arranged for the latter part of the month. This will be the last meeting until September.

EXTRUSION (Cont. from page 4)

What are the potentials of thermosetting extrusion? This cannot be answered factually since it has not yet been established, but a good guess based on industrial inquiries and interest, would show that applications wherein immediate possibilities exist are; electrical conduit, insulation, coil forms, piping for chemical, textile, paper, oil and electroplating industries, containers, housings, screw machine products, and the like.

Thermosetting extrusions could replace laminated tubes and rods in specialized applications and do a much better job—better dielectric, water resistance, finish and dimensional tolerances.

One interesting possibility is extruding housings such as clock cases or radio cabinets. Containers present numerous possibilities. Tubing with non-corroding properties hold large potential; such tubing can be joined in various ways, such as: molding flange thereon, molding threaded section thereto, which is desirable when thin wall section militates against threading directly; threading tubing directly, cementing, use of rubber or rubber-like sleeve, shrinkage fitting.

There is still much to be learned about thermosetting extrusion, but the horizon is visible and continued research should disclose new and unsuspected fields. There has been much research devoted to the thermosetting extrusion process, and only with continued research will it be accomplished. It is not suggested that every molder indulge in research on a grand scale, but it is amazing that there is such a lack of planned research and development work among the molders. Every molder should set aside a certain sum in the budget or a percentage of profits, however small, and dedicate that to research or development projects.

It is suggested that such development work not take any set outline, but rather be determined by careful analysis of the field for which your organization and facilities are best suited. It may be equipment, die design, die construction, molding processes, ornamentation, product development, or the like.

The main thing is to make a plan and then to maintain careful, complete records of your efforts.

Don't be afraid to invite outside ideas.

It is quite conceivable that two or more molders in different lines or geographically separated could pool their efforts to mutual advantage.

Remember that research and development are necessary for progress, and that a faster and sounder progress is obtained with planned and recorded efforts.

is a National Engineering Society with a membership comprised entirely of individuals, the objects of which are to promote in all lawful ways the Arts, Sciences, Standards and Engineering Practices connected with the use of plastics.

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